ECONOMIC IMPACT OF FOREIGN EXPORT CREDIT SUBSIDIES ON CERTAIN U.S. INDUSTRIES

Report to the President on
Investigation No. 332-144,
Under Section 332 of the
Tariff Act of 1930

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Preface

On June 16, 1982, at the request of the United States Trade Representative, and in accordance with provisions of section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), the United States International Trade Commission instituted investigation No. 332-144, on the economic impact of foreign export credit subsidies on certain U.S. industries. The United States Trade Representative requested the Commission to assess the impact on U.S. producers of aircraft (commuter size and larger), heavy electrical equipment, and self-propelled railcars of foreign export subsidies applied to imports of these products. Notice of the investigation was given by posting copies of the notice of investigation at the Office of the Secretary, U.S. International Trade Commission, Washington, D.C., and by publication of the notice of investigation in the Federal Register (47 F.R. 28480, June 30, 1982).

In the course of this investigation, the Commission collected data from questionnaires sent to producers, importers, and purchasers of the products covered by this report. Testimony was presented to the Commission in a public hearing from the aircraft industry, the airline industry, and the heavy electrical equipment industry. Additionally, information was gathered from published sources, from interviews with corporate executives representing producers, importers, and purchasers of the products covered in this report as well as from public data gathered in recent Commission investigations.

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Note.--The whole of the Commission's report to the United States Trade Representative may not be made public since it contains certain information that would result in the disclosure of the operations of individual concerns. This report is the same as the report to the United States Trade Representative except that the above-mentioned information has been omitted. Such omissions are indicated by asterisks.

Executive Summary

Concern is being increasingly expressed within the Government and the business public over the potential for trade distortion resulting from foreign government subsidization of financing for commodity exports.

The U.S. International Trade Commission, at the request of the President, undertook a study to assess the extent to which export credit subsidies by foreign governments actually affect the competitive position of U.S. producers of civil aircraft, heavy electrical equipment, and self propelled railcars in the domestic market. The Commission's study reveals that U.S. purchasers of certain of the imported products under study have benefitted from foreign export credit subsidies 1/ which tend to lower prices and operating costs. However, foreign export credits were not found to be a significant competitive factor in the U.S. markets for civil aircraft and heavy electrical equipment. The overall impact of subsidized foreign credits on these industries was not significant. U.S. producers of medium- and large-transport aircraft, helicopters, and heavy electrical equipment did state that export credit subsidies provided by foreign governments are of more concern and do have more of an impact on U.S. sales in foreign export markets than they do in the United States.

In the case of rail cars, foreign export credits were not a factor in the U.S. market until 1981 when U.S. Government funding for the procurement of rail passenger cars by local or regional transit authorities was reduced. This reduction prompted transit authorities to seek funding from other sources including subsidized foreign funding. 2/

The major findings of this study, summarized by industry sector, follow:

AIRCRAFT

1. Structure of the domestic and foreign industry

- The U.S. aircraft industry is the world's largest.

In 1981, the five U.S. producers of commuter aircraft delivered 677 airplanes, valued at $375 million, compared with 594 planes, valued at

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1/ For the purpose of this study, foreign export credits were considered subsidized when such credits were offered to U.S. purchasers at an interest rate below that which is commercially available in the U.S.

2/ The Commission in Inv. No. 701-TA-182 (Preliminary), Certain Rail Passenger Cars and Parts Thereof from Canada, determined on August 3, 1982, by a vote of four to one (Commissioner Paula Stern dissenting), that there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports of components of rapid transit rail passenger cars (subway cars) which are allegedly subsidized by the Government of Canada. The Commission will make its final injury determination by March 28, 1983.

$155 million in 1977. Total commuter aircraft exports increased from 143 planes, valued at $31.6 million, in 1977 to 196 planes, valued at $98.3 million, in 1981. These exports represented 24.0 percent of the quantity of total commuter aircraft shipments in 1977 and 28.7 percent in 1981. The three U.S. producers of medium- and large-transport aircraft delivered 379 aircraft, valued at $9.7 billion, in 1981, compared with 155 planes, valued at $3.2 billion, in 1977. Exports of medium- and large-transports increased from 79 planes, valued at $1.9 billion, in 1977 to 254 planes, valued at $7.2 billion, in 1981. These exports represented 51 percent of the quantity of total medium- and large-transport aircraft shipments in 1977 and 67 percent in 1981. In 1981, the seven current U.S. producers of civil helicopters delivered 1,072 helicopters, valued at $597 million, compared with 848 helicopters, valued at $251 million in 1977. Total civil helicopter exports increased from 321 units, valued at $105.5 million, in 1977 to 453 units, valued at $346.5 million, in 1981. These exports represented 37.9 percent of total helicopter shipments in 1977 and 42.3 percent in 1981.

- U.S. producers manufacture a wide variety of civil aircraft.

The domestic commuter aircraft industry produces eight models for commuter airlines. The majority of this U.S. production consists of nonpressurized aircraft with a seating capacity of 10 or fewer passengers. Currently, 2 U.S. producers manufacture commuter aircraft with a seating capacity of 15 to 19 passengers. The only U.S.-built aircraft with more than 19-passenger capacity is a modified corporate airplane. Medium- and large-transport aircraft producers currently manufacture 16 models of aircraft: 2 medium transports, 7 medium-range, large transports and 7 long-range, large transports. The domestic helicopter industry currently produces 23 models for civil use. The majority of U.S. production consists of light (under 6,000 pounds gross weight) helicopters with a seating capacity of 5 or fewer passengers. Additionally, the industry manufactures 4 intermediate (6,000 to 14,000 pounds gross weight) helicopters, 1 medium (14,000 to 25,000 pounds gross weight) helicopter, and 2 heavy (over 25,000 pounds gross weight) helicopters.

- Seventeen foreign manufacturers produce 12 different commuter aircraft models, 4 medium- and large-transports, and 17 helicopters.

The 11 foreign manufacturers of commuter aircraft currently produce 12 different models of airplanes. Two of these planes have a seating capacity of 8 to 14 passengers and 5 have 15- to 19-passenger capacity. The remainder have a seating capacity ranging from 27 to 50 passengers. The three foreign manufacturers of medium- and large-transport aircraft produce two medium-transports and two medium-range, large- transports. The four foreign manufacturers of civil helicopters currently produce 17 different models of civil helicopters. Eleven of these are light helicopters, and 6 are classified as intermediate-weight helicopters.

2. The current U.S. market

o The U.S. market is the world's largest markets for civil aircraft.

In 1981, there were approximately 277 U.S. commuter airlines, which carried over 15 million passengers. This industry constitutes the largest organized, low-density, short-haul air transportation system in the world. Industry sources estimate that the United States constitutes over half of the world market for commuter aircraft. In 1981, U.S. major and large regional airlines carried 286 million passengers on more than 5 million flights. Industry sources indicate that the United States makes up approximately half of the world market for medium- and large-transport aircraft. In 1980 (the latest year for which data are available), there were 7,028 civil helicopters operating in the United States. Approximately 4,254 of these helicopters were used in U.S. commercial operations, 1,506 were utilized as corporate helicopters, and 1,268 were used in public service operations by Federal, State and local governments.

o Imports of civil aircraft have increased substantially during 1977-81.

Imports of commuter aircraft increased from 21 planes in 1977 to 80 planes in 1981. The value of imports rose annually, increasing to $205.8 million in 1981 from $17.2 million in 1977. Imports of medium- and large-transport aircraft increased from * * * planes, valued at * * * million, in 1977 to * * * planes, valued at * * * million, in 1981. Imports of civil helicopters increased from 55 units in 1977 to 213 units in 1981. The value of imports rose to $105.5 million in 1981 from $18.1 million in 1977.

o Imports of civil aircraft constitute a growing share of the U.S. market.

During 1977-80, U.S. apparent consumption of commuter aircraft increased 34.3 percent, rising to 634 planes in 1980. Consumption, by quantity, decreased 11.2 percent in 1981. The value of apparent consumption rose from $140.5 million in 1977 to $482.6 million in 1981. The ratio of imports to apparent consumption was 4.4 percent by quantity and 12.2 percent by value in 1977. By 1981, these ratios had increased to 14.2 percent (quantity) and 42.6 percent (value). Apparent U.S. consumption of medium- and large- transport aircraft increased from * * * planes in 1977 to * * * planes in 1981. The value of U.S. consumption rose from * * * billion in 1977 to * * * billion in 1981. The ratio of imports to apparent consumption was * * * percent in quantity and * * * percent in value in 1977. In 1981, the ratio remained at * * * percent by quantity, but increased to * * * percent, by value. During 1977-81, U.S. apparent consumption increased from 582 civil helicopters in 1977 to 832 civil helicopters in 1981. The value of apparent consumption rose from $163.6 million in 1977 to $356.0 million in 1981. The ratio of imports to apparent U.S. consumption of civil helicopters was 9.5 percent by quantity and 11.1 percent by value in 1977. By 1981, these ratios had increased to 25.6 and 29.6 percent, respectively.

3. Factors of competition

- U.S. producers of civil aircraft are equal or superior to foreign producers in most factors of competition, but are at a disadvantage in the area of capital formation.

According to industry sources, U.S. producers of commuter aircraft are equally competitive with foreign producers in raw-material availability and have a competitive advantage in labor costs. U.S. producers of medium- and large-transport aircraft and civil helicopters indicate that the technology level and quality of foreign and domestic products are comparable. However, commuter airline operators maintain that foreign commuter aircraft are technologically superior to domestic models in certain respects.

In regard to capital formation, U.S. producers of commuter aircraft, medium- and large-transport, and civil helicopters strongly assert that, because of their special relationships to their respective governments, foreign manufacturers have a distinct advantage. These producers are often able to obtain capital in the form of loans, grants, or loan guarantees to develop, improve, market, and finance their products. This is due to the fact that the majority of foreign producers are owned wholly or in part by their respective governments. American producers, however, must depend on internal capital or the commercial market for these funds. The availability of such funds in the U.S. for domestic producers depends on the financial condition of the producer or the market outlook for their products and is not a function of Government policy.

- Financing ranks low as a decision factor for civil aircraft purchases.

Based on questionnaire responses, U.S. commuter airline operators reported that financing offered was not a critical factor in their decision to purchase commuter aircraft. In a list of purchasing decision criteria, financing ranked number 10 out of 15 criteria cited by U.S. commuter airlines. Passenger capacity and fuel efficiency were cited as the most important decision factors, due to their influence on a commuter airline's operating costs. U.S. major and large regional airlines reported in questionnaire responses that financing was not a critical factor in their decision to purchase medium- and large-transport aircraft. Among a list of purchasing decision criteria, financing ranked 8 out of 12 criteria cited by these airlines. Fuel efficiency, passenger capacity, and price, respectively, were named as the most important decision factors in the purchase of medium- and large-transports. Based on questionnaire responses, U.S. helicopter operators reported that financing was not a critical factor in their decision to purchase civil helicopters. In a list of 12 purchasing criteria, financing ranked ninth, as cited by U.S. operators. Price, passenger capacity, and quality, respectively, were noted as the most important decision factors.

4. Foreign government export policies and their impact on the U.S. industry

o Most countries provide medium-term and long-term credit and other export incentives as a means of enhancing their exports.

Most foreign governments have developed systems to provide medium-term and long-term credits to exporters of capital intensive products such as aircraft. In the majority of countries exporting commuter aircraft to the U.S., official financial support is provided through the banking system or directly through government agencies. Official foreign government support of export financing of civil aircraft occurs in two ways--through government-supported insurance programs and guarantee programs, and through direct government support of interest rates and capital supply.

o The methods of financing used to purchase civil aircraft differ in each sector.

Questionnaire data indicate that, since 1977, leasing and seller financing of commuter aircraft purchases have increased in importance; bank loans have decreased in importance. Rising interest rates and increasing difficulty by the airlines in obtaining bank loans have apparently caused these changes. Medium- and large-transport aircraft are primarily financed through bank loans, but the importance of leasing has greatly increased since 1978. Foreign export credits have not been used by U.S. purchasers of these aircraft from 1979 to 1982, although such credits were used by two domestic airlines in 1977 and 1978. Helicopters are primarily financed through bank loans and seller financing. Both domestic and foreign producers offer seller financing. However, most imported helicopters are purchased with conventional market financing.

o Foreign export credit subsidies and, in some instances, financing offered by domestic manufacturers, applied to civil aircraft can reduce the cost of purchasing aircraft and offset decreases in price or increases in fuel efficiency.

Commuter airlines often receive offers for the financing of foreign commuter aircraft at interest rates far below the rates they would have to pay if financing were obtained through normal commercial channels. The most generous financial terms offered by foreign producers can reduce the cost of purchasing an aircraft by 12.5 percent, compared with the cost of purchasing under prime-rate financing. The least generous financial terms offered by foreign manufacturers can reduce the cost of purchasing an aircraft by 1.9 percent, compared with the cost of purchasing under prime-rate financing. Domestic producers indicate that, in a few cases, they have offered a financing package which included below-market financing for a portion of the loan period. In general, however, financing available to purchasers of domestic commuter aircraft is 0.5 to 2 percentage points above the prime rate. In the purchase of medium- and large-transport aircraft, a 1 percentage point difference in interest rates, due to foreign export credit subsidies, can offset as much as a 3-percent price advantage and a 2-percent increase in

fuel efficiency because of the relative importance of interest cost in total operating costs. Domestic manufacturers do not generally offer financing to purchasers of medium- and large-transport aircraft. However, in a few U.S. sales, financial packages with a market interest rate or partial loan guarantees have been offered by the U.S. industry. The financing offered to purchases of imported civil helicopters usually is at an interest rate below the rate an operator would pay with financing obtained through normal channels. Typical terms of importers' financing can reduce the cost of purchasing by approximately 1 percent if the market rate is 14 percent, and 2 percent if the market rate is 16 percent. The majority of U.S. civil helicopter manufacturers offer some type of financing; however, the interest rate is typically 2 percentage points above the market rate.

- Alleged lost sales, due to export credit financing were only cited by commuter aircraft manufacturers.

Based on questionnaire responses of U.S. commuter aircraft producers, during 1978-81, there were a total of * * * sales lost to foreign manufacturers of commuter aircraft due to export credit financing. These sales amounted to an average of less than * * * percent of annual shipments over this period. If these sales had not been lost to imports, a total of * * * more persons would have been employed in the commuter aircraft industry according to questionnaire responses. Profits over this period would have gained an additional * * * million if these sales had not been lost. However, the majority of the lost sales are for * * * planes with a * * * passenger capacity. These alleged lost sales, as a share of total U.S. shipments in this * * * category, represented * * * percent of U.S. deliveries of such aircraft in 1978, * * * percent in 1979, * * * percent in 1980, and * * * percent in 1981. However, the one-for-one displacement estimate may overstate the impact since, in general, the domestic industry could respond to an increase in imports by reducing price. With lower prices, total sales would most likely expand and domestic output, most likely decline by less than the increase in imports. Additionally, since imported aircraft normally contain U.S. components such as avionics, and landing gear and hydraulics systems, the effect of imported aircraft on the aircraft supplying industry would be further lessened. There were no lost U.S. sales due to foreign export credit subsidies cited by domestic producers of civil helicopters during 1977-81.

- U.S. producers of civil aircraft claim numerous lost sales in export markets due to export credit subsidies.

Although their principal market is the United States, U.S. producers of commuter aircraft indicate that they have lost a number of sales in South America to foreign manufacturers offering export credit financing at below-market rates. Medium- and large-transport aircraft producers indicate that in many additional export markets, the existance of export credit subsidies is one of the principal reasons for their declining export sales. U.S. civil helicopter producers indicate that they have lost at least * * * export sales to foreign manufacturers due to subsidized price and liberalized financing terms.

5. The future U.S. market

o The U.S. market for civil aircraft is predicted to grow significantly in the next decade.

Although the long-range outlook for civil aircraft sales is good, the immediate future for such sales is not. The unstable economic environment and high interest rates have forced many purchasers to delay ordering new equipment. Industry sources indicate that orders for new aircraft are likely to be depressed through 1983. However, as the U.S. economy recovers, the industry expects a large number of new orders.

The major market for commuter aircraft will continue to be the United States. Industry marketing specialists estimate that the potential U.S. market for commuter aircraft during 1980-2000 will exceed 2,500 planes. Commuter aircraft with a seating capacity over 30 passengers have been identified as the fastest growing segment of this anticipated demand. Data obtained from industry questionnaires indicate that almost * * * percent of commuter airlines' planned equipment acquisitions will be for planes in this category. The U.S. commuter aircraft industry is currently marketing only two aircraft in the 30 plus seating capacity. Industry sources estimate the potential U.S. market for medium- and large-transport aircraft during 1980-90 will range from $44 billion to $50 billion. Data obtained from industry questionnaires indicate that * * * percent of U.S. major and large regional airlines' planned equipment acquisitions during 1982-86 will be for medium transports with 100 to 120 seats. Over * * * percent of total new acquisitions will be medium-range large transports with 121 to 170 seats. The U.S. medium- and large-transport aircraft industry currently manufactures 4 aircraft in these categories. Additionally, two domestic manufacturers are considering production of a 150 seat medium-range large transport. Industry officials estimate that the potential U.S. market for civil helicopters during 1982-90 will exceed $6.6 billion. Light- and intermediate-class helicopters have been identified as the fastest growing segment of this anticipated demand. Data obtained from industry questionnaires indicate that U.S. operators plan to purchase approximately * * * civil helicopters during 1982-86. The U.S. helicopter industry currently produces 20 models of light and intermediate class civil helicopters.

o Each $100 million in civil aircraft production not undertaken by U.S. firms results in a loss of $210 million in production and more than 2,700 jobs in all industry sectors.

For each hypothetical $100 million in production not undertaken by U.S. civil aircraft manufacturers because of foreign competition, the Commission estimates a total loss of 2,723 jobs and a $209.6 million loss in total output in all sectors of the U.S. economy. The majority of the lost employment and production would be in the aircraft sector--with estimated losses of 1,363 jobs and $118.3 million in production. In other manufacturing sectors, 596 jobs and $54.7 million in output would be lost. The loss in other miscellaneous industries would total 764 positions and $36.6 million in production.

HEAVY ELECTRIC EQUIPMENT

1. Structure of the domestic and foreign industry

o The U.S. heavy electrical equipment industry is highly concentrated, but very competitive in the face of slowly rising equipment demand.

There are currently nine U.S. producers of heavy electrical equipment; however, two of these firms contribute a major share of industry shipments. U.S. producers' shipments * * * from about * * * in 1977 to * * * in 1981, or by only 4 percent. U.S. producers' contract awards increased from * * * in 1977 to * * * in 1981, or by 19 percent, but this improvement was largely on the strength of foreign contract awards throughout the period and on domestic land, steam, and gas turbine generator awards in 1981.

o With minor exceptions, the principal economic indicators for the heavy electrical equipment industry have declined since 1977.

U.S. producers' capacity utilization rates for all heavy electrical product lines except power circuit breakers, which * * * from * * * to * * * percent, * * * between 1977-81. These * * * ranged from * * * percent for power transformers to * * * percent for land and steam turbine generator production. Annual investment expenditures by U.S. producers increased by nearly 50 percent during 1977-80, but then declined by 16 percent in 1981. The profitability of the U.S. industry generally * * * during 1977-81. Circuit breaker operations * * * on net sales of * * * percent in 1977 and a * * * in 1981. Power transformer operations * * * from an almost * * * percent net operating * * * in 1977 to a net operating * * * percent in 1981. The net operating profits (loss) to net sales of steam and gas turbine generator operations rose to a * * * percent in 1980 from a * * * percent * * * in 1977; * * * in 1981, * * * to * * * percent. Finally, industry employment * * * percent during 1977-81. The reductions were most pronounced in the circuit breaker and steam turbine generator operations of U.S. producers.

2. The current U.S. market.

o The U.S. market for heavy electrical equipment is principally composed of U.S. electric utilities.

The U.S. market for heavy equipment is essentially composed of some 200 public- and investor-owned utilities and electric cooperatives. Approximately 80 of these potential customers are estimated to purchase 95 percent of all equipment. Since 1973, these utilities have faced increasing financial pressure as the result of higher fuel costs which they have had great difficulty in passing to consumers. High interest rates have also substantially increased the cost of to most U.S. utilities adding to their generating capacities.

o U.S. market growth is currently hampered by the slow expansion in demand for electric power.

As the growth in demand for electric power has declined from pre-1973 levels of 7 to 9 percent to current 2 to 3 percent annual increases, U.S. utilities have delayed or scheduled equipment purchases over a longer period of time. U.S. utilities have further exaggerated the decline in demand for equipment by lowering their capacity generating margins, purchasing power from areas of excess generating capacity, and by practicing better management over peak-load periods of demand for electricity.

3. Factors of competition

o U.S. and foreign producers have mixed competitive advantages in the U.S. market.

The current comparative advantage of U.S. and foreign producers of heavy electrical equipment with respect to the factors of competition in the U.S. market were reported by U.S. producers to be mixed. Access to, and prices for, raw materials were reported equivalent in U.S. and foreign markets. Labor costs on the other hand, were said to be higher in Europe than in the United States but lower in Japan. Higher productivity in the United States, however, was reported to offset the Japanese labor advantage.

Capital formation in offshore markets was cited as a major advantage of foreign producers. Liberalized accounting rules, hidden/ untaxed reserves, and deferred taxes were enumerated as methods used for the raising of foreign capital which disadvantaged U.S. firms. Foreign government subsidies and economic risk guarantees were also cited. With respect to product technology, U.S. leadership was reported as established by reliability and efficiency statistics published by various regulatory commissions and councils.

U.S. producers also indicated that the major advantage of foreign producers are closed home markets coupled with the forgiveness of value-added taxes on exports, and the application of border taxes on imports.

4. Foreign government export policies and their impact on the U.S. industry

o Lost sales of heavy electrical equipment due to export credit financing were nonexistent during 1977-81.

In responses received in Commission questionnaire from 28 domestic utilities, in no instance was a contract awarded on the basis of financial terms of sales. All contracts were largely awarded on the basis of nominal price after due consideration was given to the technical competence of suppliers. Discussions did take place between domestic utilities and foreign producers over three large projects where export credit financing could have determined a contract award, but these projects were either canceled or postponed because of prohibitive costs or because of declining demand for electric power.

- <u>The cost to U.S. utilities of financing heavy electrical equipment purchases increased significantly during 1977-81</u>.

The interest rates on high-grade utility bonds rose from 8.19 percent per annum in 1977 to 15.61 percent in July 1982, or by 90 percent.

- <u>The future role of export credit financing will depend upon prospective utility bond rates and minimum Organization for Economic Corporation and Development (OECD) loan guidelines</u>.

Effective July 6, 1982, the minimum rates of interest allowed under the OECD Arrangement which can be offered by "relatively rich countries" for export credit financing are limited to 12.15 percent per annum on 2- to 5-year loans and 12.4 percent on 5- to 8.5-year loans. The interest currently accrued on high-grade utility bonds is higher than these rates and is near the prime rate banks charge their most favorite customers. In the future, if utility bond rates rise substantially above the rates allowed under the Arrangement, or of the agreement is violated, export credit financing will become an increasingly attractive alternative to U.S. utilities.

5. The future U.S. market

- <u>Producers' 5-year market projections assume little or no growth in U.S. demand</u>.

As the result of low current and anticipated future levels in the growth of demand for electric power and also of high current utility generating reserve margins, the projected U.S. demand for heavy electrical equipment is expected to remain depressed through 1986. New orders for steam turbine generator units were estimated to average * * * during 1982-86, well below historical levels. The demand for power transformers, which currently is at a 20-year low, is also not expected to improve through the period, and most of the new orders for gas turbine generator units are expected to originate offshore. Demand for power circuit breakers is expected to follow the demand for the other categories.

- <u>Each $100 million in heavy electrical equipment production not undertaken by U.S. firms results in a loss of $222 million in production and more than 3,000 jobs in all industry sectors</u>.

For each hypothetical $100 million in production not undertaken by U.S. heavy electrical equipment manufacturers because of foreign competition, the Commission estimates a total loss of 3,046 jobs and a $222 million loss in total output in all sectors of the U.S. economy. The majority of the lost employment and production would be in the heavy electrical equipment sector--with an estimated loss of 1,537 jobs and $102 million in production. In other manufacturing sectors, 808 jobs and $86 million in output would be lost. The loss in other miscellaneous industries would total 701 jobs and $34 million in production.

SELF-PROPELLED RAIL PASSENGER CARS

1. Structure of the domestic and foreign industry

   o <u>Only one U.S. car builder continues to seek prime contracts</u>.

Since 1976, four U.S. rail car builders ceased bidding for rail passenger car prime contracts, leaving only one domestic builder, the Budd Co., seeking such contracts. U.S. car builders' deliveries in the domestic market decreased from 803 rail passenger cars in 1977 to 150 cars in 1981. Virtually all of the material and labor content of these cars was U.S. in origin. Only six cars were exported during 1977-81.

   o <u>U.S. car builders concentrate production in rapid transit, commuter, and intercity cars</u>.

During 1977-81, rapid transit cars accounted for 39 percent of U.S. builders' domestic deliveries, commuter cars, for 28 percent, intercity cars, for 23 percent, and LRV's, for 10 percent. Virtually all cars delivered by Budd during 1977-81 were commuter and intercity cars. Budd had an order backlog of approximately 1200 cars as of April, 1982. Most of its current order backlog consists of rapid transit cars, and it also has orders for commuter and intercity cars.

   o <u>Eleven foreign car builders produce every type of rail passenger car</u>.

Twelve foreign car builders (one no longer produces) delivered rail passenger cars to the U.S. market during 1977-81. Virtually all such deliveries were rapid transit cars and LVR's, with the bulk being rapid transit cars. Bombardier of Canada won the largest award, 825 rapid transit cars. It also has contracts to deliver commuter cars and LRV's in the U.S. markets. The total of Kawasaki's awards is also large, consisting of rapid transit cars and LRV's.

2. The current U.S. market

   o <u>The U.S. market is erratic and limited in size</u>.

Purchases of rail cars have come in cycles of very large batches, rather than in consistant annual amounts. This creates substantial capacity and employment problems for builders. Since the 1960's, Urban Mass Transportation Authority (UMTA) has provided substantial funds for purchase of rail cars and for the building of new transit systems, as well as capital and operating assistance. This has increased the size of the U.S. market, but it still remains small when compared with the markets, in Japan and Western Europe.

o <u>Imports increased substantially during 1977-81.</u>

U.S. deliveries of rail passenger cars produced by foreign car builders decreased from 36 in 1977 to 10 in 1978 and then increased annually to 245 cars in 1981. Out of the 534 passenger cars delivered by foreign car builders during 1977-81, 395 were rapid transit cars; 103 were LRV's, and 36 were commuter cars. In addition, 10 intercity cars were leased and returned by Amtrak.

o <u>Imports constitute a growing share of the U.S. market.</u>

Apparent U.S. consumption of rail passenger cars decreased from 839 cars in 1977 to 328 cars in 1978 and then increased annually to 395 cars in 1981

The ratio of imports to consumption of finished rail passenger cars decreased from 4.3 percent to 3.0 percent in 1978 and then increased sharply to 62.0 percent in 1981. Because of the large number of contracts awarded to foreign car builders, accounting for the bulk of anticipated orders for cars up to 1988, this ratio can be expected to increase. However, it should be noted that, because UMTA funds were used in purchasing cars from foreign car builders, at least 50 percent (often much more) of the material content of the car must be of U.S. origin.

o <u>Rapid transit cars are the largest U.S. rail passenger car market.</u>

In 1975, rapid transit cars constituted nearly three-fifths of all rail passenger cars in the U.S. fleet. Rapid transit cars accounted for nearly one-half of all U.S. rail passenger deliveries during 1977-81. Combining undelivered backlog of rail passenger cars ordered, as of December 31, 1981, and rail passenger cars ordered subsequently, rapid transit cars accounted for about three-fourths of the total.

3. Factors of competition

o <u>Foreign rail passenger car manufacturers appear to have a competitive advantage in the area of capital formation.</u>

The Budd Co. stated that "foreign competitors apparently receive low-interest financing for facility expansion and working capital." Information developed in the report suggests that foreign governments do provide aid in this area, especially for research and development, in conjuction with a greater sustained commitment to public rail transit than exist in the United States.

o <u>Price has been the most important factor in the purchasing decision of public authorities for rail passenger cars.</u>

Virtually every purchase contract was awarded on the basis of competitive bidding process in which the contract, by the Buy American provision had to be awarded to the lowest responsive responsible bidder. If the bid was responsive to the design specifications and offered the lowest price per car, the contract was awarded to that bidder. Only with the advent of competitive bidding outside the authority of the Buy American provision, initiated by Metropolitan Transit Authority (MTA) in 1981 have financing factors become important. Because of financing for rail passenger cars comes from public sources and the competitive bidding process was closely controlled, vendor financing was not an issue prior to the purchases by MTA of the R-62 subway cars.

4. Foreign government export policies and their impact on the U.S. industry

o <u>Before 1981, foreign governments did not offer government export credit subsidies in the U.S. market, however, after 1981, as UMTA funds were reduced, this situation changed.</u>

Except for Amtrak, most purchases of rail passenger cars, prior to 1981, were 80 percent funded by UMTA, with remainder funded by State and local authorities. Because UMTA funding is being reduced, transit authorities are seeking new sources of financing, such as bonds. Rapidly increasing interest rates and growing uncertainty in the bond market after 1981 spurred some transit authorities also to seek seller financing. Other major alternative sources were fares, tax revenues, and safe harbor leasing. In addition, the magnitude of MTA's capital acquisition needs induced it to seek seller financing.

o <u>Two lost sales involved foreign government export credit financing, and the purchasing authority has announced its intention to reject the use of one offer</u>

The two contracts for 1,150 R-62 rapid transit cars awarded in 1982 accounted for 28 percent of the total of 4,149 rail passenger cars in contracts awarded between January 1977 and November 1982. However, in October, MTA announced its intention to cancel use of Japanese seller financing and use bonds backed by its revenues on 325 cars purchased from Kawasaki. MTA had recently issued $250 million of bonds at an average interest rate of 9.7 percent. In November 1982, MTA and the Export Development Corporation (EDC) of Canada signed a agreement in which EDC will loan MTA funds covering 85 percent of the value of the contract at an interest rate of 9.7 percent.

5. The future U.S. market

o The size and growth of the U.S. market are very uncertain during the foreseeable future.

The largest traditional source of funding for rail passenger vehicles, UMTA, has elimated funds for new rail starts and is curtailing funds for other capital acquisitions and for operating subsidies. During times of severe fiscal austerity at Federal, State, and local levels of government, purchasing authorities have searched agressively for new sources of revenues. The success of this search will determine the size of the market.

Anticipated orders for 1982-88 amounted to 2,400 to 2,800 cars. However, as of November 1982, nearly two-thirds (1,796 cars) had already been ordered. MTA accounted for the great bulk of such orders.

o Share of rail passenger cars supplied by foreign car builders likely to grow.

With the Budd Co. being the only remaining U.S.-based prime contractor, it appears that foreign car builders will increase their share of the U.S. market for finished rail cars. However, Buy America provisions and the preference of purchasing authorities for purchasing certain U.S. major subassemblies and of other parts should mean that producers of these products will receive business whether the prime contract is awarded to Budd or a foreign car builder. However, as sources of funds become more non-UMTA and foreign car builders convince purchasers of savings which could be generated by switching to foreign parts, following testing and approval by the local purchasers, these suppliers would eventually lose business.

o Each $100 million in self-propelled railcar production not undertaken by U.S. firms results in a loss of $241 million in production and more than 2,860 jobs in all industry sectors.

For each hypothetical $100 million in production not undertaken by U.S. self propelled railcar manufacturers because of foreign competition, the Commission estimates a total loss of 2,863 jobs and a $241 million loss in total output in all sectors of the U.S. economy. The majority of the lost employment and production would be in the self propelled railcar sector--with an estimated loss of 1,259 jobs and $108 million in production. In other manufacturing sectors, 997 jobs and $102 million in output would be lost. The loss in other miscellaneous industries would total 607 jobs and $32 million in production.

AIPCRAFT

The U.S. civil aircraft industry is the world's largest. In total, the industry produced 10,916 aircraft, valued at $13.2 billion, in 1981. Additionally, the United States represents the largest market for this production. Almost 70 percent of the quantity of total civil aircraft production is sold to U.S. purchasers. 1/ U.S. producers of civil aircraft have traditionally dominated the world market. In recent years, however, foreign manufacturers have made a large number of sales in many traditional U.S. export markets. In the United States, foreign producers of jet transports have had limited success while other foreign manufacturers of civil aircraft have been very successful in other market segments. For the purposes of this report, the aircraft industry is discussed in three major segments: commuter aircraft, medium- and large-transport aircraft and helicopters. Each type of aircraft serve uniquely different markets and the growth (or decline) in each industry segment, therefore, depends on different economic considerations.

Commuter Aircraft

The Structure of the U.S. Industry and That of Major Foreign Competitors

Product description

Commuter aircraft are civil airplanes powered by piston, turboprop, turbojet, or turbofan engines; having a seating capacity ranging from 8 to 60 passengers and a payload capacity for all cargo not to exceed 18,000 pounds; and used in scheduled passenger transportation. 2/

Currently, there are 26 commuter aircraft models in operation, produced by manufacturers in 13 countries. Twelve of those models were produced by 5 U.S. companies. There are also 12 models in current stages of development, 5 of which are being developed by U.S. companies. The development of one of the new U.S. models is a joint effort by Fairchild Aircraft (U.S.) and Saab-Scandia of Sweden. All new models will be available during 1982-85. A listing of the commuter aircraft in service in 1981 and the new models currently under development are listed in appendix A.

U.S. industry

Currently, there are five U.S. producers of commuter aircraft: Fairchild Aircraft Corp., Gulfstream American Corp., Cessna Aircraft Co., Piper Aircraft

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1/ Aerospace Industries Association, Aerospace Facts and Figures, 1982/83, 1982, pp. 34 and 35.

2/ Under the Federal Aviation Act, sec. 412, C2B, the category "small airplanes" (which includes commuter airplanes) is defined as those planes with less than 60-passenger capacity and 18,000 pounds or less payload capacity. There are currently no airplanes specifically built for the commuter airplane market with less than 8-passenger capacity.

Corp., and Beech Aircraft Corp. Additionally, there are two firms which have aircraft under development: Commuter Aircraft Corp. (Youngstown, Ohio) and Ahrens Aircraft Corp. (Ramsey, P.R.). However, Ahrens Aircraft Corp. is currently in chapter 11 bankruptcy proceedings. 1/ There is also a U.S. firm, International Aviation Corp. (Homestead, Fla.) which has purchased the manufacturing rights for an eight-passenger aircraft currently produced in Switzerland. The firm plans to produce the aircraft in the United States by early 1983. 2/ The 5 producers operate 13 production or assembly facilities in the United States.

The domestic industry currently produces eight models of aircraft for commuter use. The majority of these are nonpressurized airplanes with a seating capacity of 10 or fewer passengers. U.S.-manufactured commuter airplanes now account for the majority of such aircraft in service. However, foreign producers are now competing in almost every segment of the commuter aircraft market and, as a result, U.S. companies have lost market share in the United States and in worldwide markets in recent years.

All U.S. commuter aircraft manufacturers produce other general aviation and/or corporate aircraft. Also, at least one U.S. company produces components for military aircraft and missiles. An analysis of each of the five U.S. companies is provided in appendix B.

U.S. shipments.--U.S. producers' total shipments increased during 1977-79, as commuter airlines expanded their markets and purchased new equipment (table 1). Shipments increased to 768 units in 1979, or by 29.3 percent over the 1977 total. Shipments then decreased in 1980 and 1981, falling 0.9 percent and 11.0 percent, respectively. Approximately 71.3 percent of U.S. producers' shipments were sold in the United States in 1981, compared with nearly 76 percent in 1977 (table 2.) The value of shipments, however, increased annually, rising from $155 million in 1977 to $375 million in 1981, or by 142 percent. In part, the rising value of total shipments is due to the increased number of * * * -seat passenger planes produced in the United States. In 1977, aircraft with * * * seats accounted for * * * percent of the total value of shipments; by 1981, this figure had dropped to almost * * * percent.

1/ "Ahrens Files for Bankruptcy," Flight International, July 1982, p. 118.
2/ "U.S. Distributor Buys Trislander Rights," Aviation Week and Space Technology, Sept. 6, 1982, p. 76.

Table 1.--Commuter aircraft: U.S. producers' total shipments (domestic and export), by seating capacities, 1977-81 1/

Seating capacity	1977	1978	1979	1980	1981
	Quantity (units)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	594	575	768	763	677
	Value (1,000 dollars)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	155,010	182,715	266,434	323,310	375,087

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization, and any optional equipment.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 2.--Commuter aircraft: U.S. producers' domestic shipments, by seating capacities, 1977-81 1/

Seating capacity	1977	1978	1979	1980	1981
	Quantity (units)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	451	395	541	548	483
	Value (1,000 dollars)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	123,384	124,281	186,156	230,686	276,834

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization, and any optional equipment.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Contract awards.--U.S. producers' contract awards are the best indication of future deliveries. Depending on the industry backlog, deliveries of 15- to 19-seat or larger aircraft typically begin 1 to 2 years after the contract is made. However, aircraft with less than 14-passenger capacity are often sold through distributors; therefore, these data are not strictly indicative of future shipments. Domestic contract awards fluctuated during 1977-81, and in 1981 gained 12.4 percent in quantity and 160.8 percent in value (table 3) from the 1977 levels. U.S. producers' foreign contract awards followed the same trend as domestic awards. In 1981, these orders increased 87 percent in quantity and 209 percent in value over 1977 awards (table 4). Foreign awards in 1981 totaled 129 aircraft, valued at $68 million. Aircraft with 8- to 14-passenger capacity constitute the majority of foreign contract awards.

Table 3.--Commuter aircraft: U.S. producers' domestic contract awards, by seating capacities, 1977-81 and January-August 1982 1/

Seating capacity	1977	1978	1979	1980	1981	Jan.-Aug. 1982
	Quantity (units)					
8 to 14	***	***	***	***	***	***
15 to 19	***	***	***	***	***	***
20 to 29	***	***	***	***	***	***
30 to 50	***	***	***	***	***	***
51 to 60	***	***	***	***	***	***
Total	170	123	165	209	191	2/
	Value (1,000 dollars)					
8 to 14	***	***	***	***	***	***
15 to 19	***	***	***	***	***	***
20 to 29	***	***	***	***	***	***
30 to 50	***	***	***	***	***	***
51 to 60	***	***	***	***	***	***
Total	49,812	67,754	89,648	106,722	129,913	2/

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization and any optional equipment.
2/ Not available.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4.--Commuter aircraft: U.S. producers' foreign contract awards, by seating capacities, 1977-81 and January-August 1982 1/

Seating capacity	1977	1978	1979	1980	1981	Jan.-Aug. 1982
	Quantity (units)					
8 to 14	***	***	***	***	***	***
15 to 19	***	***	***	***	***	***
20 to 29	***	***	***	***	***	***
30 to 50	***	***	***	***	***	***
51 to 60	***	***	***	***	***	***
Total	69	86	123	135	129	2/
	Value (1,000 dollars)					
8 to 14	***	***	***	***	***	***
15 to 19	***	***	***	***	***	***
20 to 29	***	***	***	***	***	***
30 to 50	***	***	***	***	***	***
51 to 60	***	***	***	***	***	***
Total	22,152	40,603	63,270	56,306	68,456	2/

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization, and any optional equipment.

2/ Not available.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Total contract awards for commuter aircraft reached their highest level in 1980, when 344 aircraft, valued at $192.5 million, were ordered. Contract awards declined in 1981 by 7.0 percent in quantity and 2.7 percent in value, as both foreign and domestic purchasers decreased their U.S. orders due to a falloff in ridership and high interest rates (table 5). Information regarding contract awards for January-August 1982 is available only for aircraft with 15- to 19-passenger capacity. These orders (foreign and domestic) totaled * * * planes, valued at * * * million.

Table 5.--Commuter aircraft: U.S. producers' total contract awards, by seating capacities, 1977-81 and January-August 1982 1/

Seating capacity	1977	1978	1979	1980	1981	Jan.-Aug. 1982
	Quantity (units)					
8 to 14	***	***	***	***	***	***
15 to 19	***	***	***	***	***	***
20 to 29	***	***	***	***	***	***
30 to 50	***	***	***	***	***	***
51 to 60	***	***	***	***	***	***
Total	239	209	288	344	320	2/
	Value (1,000 dollars)					
8 to 14	***	***	***	***	***	***
15 to 19	***	***	***	***	***	***
20 to 29	***	***	***	***	***	***
30 to 50	***	***	***	***	***	***
51 to 60	***	***	***	***	***	***
Total	71,964	108,357	152,918	192,527	187,377	2/

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization, and any optional equipment.

2/ Not available.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Capacity.--The U.S. commuter aircraft industry's capacity to produce increased from 872 planes in 1977 to 1,125 planes in 1981, or by 29.0 percent (table 6). Capacity utilization increased to 83 percent in 1979, but decreased in the following 2 years. In 1981, domestic manufacturers were operating at 60 percent capacity. The industry attributes this decline to high interest rates, an unstable economy, decreased demand for commuter aircraft, and increased foreign competition in the U.S. market.

Table 6.--Commuter aircraft: U.S. producers' capacity, production, 1/ and capacity utilization rates, 1977-81

Item	1977	1978	1979	1980	1981
Capacity-------------units--:	872	898	924	1,038	1,125
Production-----------do----:	594	575	768	763	677
Capacity utilization rate------------percent--:	68	64	83	74	60

1/ Production data were not gathered, but they are assumed to approximate shipments.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Investment expenditures.--U.S. producers' 1/ investment expenditures for real estate, plants, and equipment increased annually during 1977-80, rising from * * * million in 1977 to * * * million in 1980. Expenditures then declined by 6.4 percent in 1981 due to decreasing sales in the industry (table 7).

Large research and development (R&D) expenditures are especially important to the commuter aircraft industry in allowing producers to offer improved planes and remain competitive. R&D expenditures amounted to * * * million in 1977. They increased in the following 2 years, by 54.2 percent by 1979, and then fell by 3.5 percent in 1980. R&D amounted to * * * million in 1981, representing an increase of 4.9 percent over that of the previous year (table 7). The majority of this increase is attributable to research on the * * * aircraft, currently under development. * * *. In general, research currently being conducted in the commuter aircraft industry is directed towards the increased use of composites and bonding techniques in the airframe structure to provide weight savings for greater fuel efficiency.

1/ Data do not include * * *.

Table 7.--U.S. producers' investment expenditures, 1/ 1977-81

(In thousands of dollars)

Item	1977	1978	1979	1980	1981
Real estate, plant, and equipment----------	***	***	***	***	***
Research and development------------------	***	***	***	***	***
Total----------------	***	***	***	***	***

1/ Data do not include * * *.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Profitability.--With one exception, U.S. producers of commuter aircraft are predominantly manufacturers of corporate and private-use airplanes. Commuter production is generally a small portion of their total business. Net operating profits on all operations of the U.S. industry during 1977-81 increased by 64.5 percent, reaching $237.4 million in 1981. The ratio of net operating profit to net sales trended downward over this period, reaching 7.6 percent in 1981 (table 8).

According to industry figures, commuter aircraft operations are generally more profitable than that of total aircraft operations. Net sales of commuter aircraft increased each year during 1977-81, rising from $155.0 million in 1977 to $364.7 million in 1981. Net operating profit fluctuated during this period. In 1979, profits increased 92.9 percent from the 1977 level, reaching $35.4 million. In 1980 and 1981, profits decreased, falling 19.3 and 9.9 percent, respectively. The ratio of operating profit to net sales trended downward over the 5-year period, rising to a high of 14.5 percent in 1978 and reaching a low of 7.1 percent in 1981 (table 9).

Employment.--Employment in the commuter aircraft industry tends to be cyclical, following the general pattern of the economy. Large fluctuations in employment are quite common in the industry; producers respond to slack demand by substantially reducing employment. The total number of persons employed by U.S. firms which produce commuter aircraft increased 18.6 percent during 1977-79 but declined in the following 2 years, representing a net gain of 4.7 percent over the 5-year period (table 10). Approximately 64 percent of those employed were directly engaged in the production of civil aircraft in 1981. The number of workers engaged in the manufacture of commuter aircraft is a small portion of total employment in all operations. Commuter aircraft employment increased 61.1 percent during 1977-80, reaching 5,586 workers in 1980. Due to declining orders for new commuter aircraft in 1980, U.S. producers decreased employment by 14.0 percent in 1981. Over the 5-year period, approximately 64 to 70 percent of the total number of persons employed in manufacturing commuter aircraft were production workers.

Table 8.--Profit-and-loss experience of U.S. producers on the overall operations of the reporting establishments in which all products are produced, by firms, 1977-81

Year and firm	Net sales	Cost of goods sold	Gross profit or (loss)	General, selling, and administrative expenses	Net operating profit or (loss)	Ratio of net operating profit or (loss) to net sales
	1,000 dollars					Percent
1977:						
Beech Aircraft Corp	***	***	***	***	***	***
Cessna Aircraft Co	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp	***	***	***	***	***	***
Piper Aircraft Co	***	***	***	***	***	***
Total or average	833,479	656,246	177,233	82,903	144,330	11.8
1978:						
Beech Aircraft Corp	***	***	***	***	***	***
Cessna Aircraft Co	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp	***	***	***	***	***	***
Piper Aircraft Co	***	***	***	***	***	***
Total or average	1,078,444	870,518	207,926	101,075	175,851	9.9
1979:						
Beech Aircraft Corp	***	***	***	***	***	***
Cessna Aircraft Co	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp	***	***	***	***	***	***
Piper Aircraft Co	***	***	***	***	***	***
Total or average	1,345,892	1,088,482	257,410	129,432	210,978	9.5
1980:						
Beech Aircraft Corp	***	***	***	***	***	***
Cessna Aircraft Co	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp	***	***	***	***	***	***
Piper Aircraft Co	***	***	***	***	***	***
Total or average	1,370,495	1,140,862	229,633	154,360	171,273	5.4
1981:						
Beech Aircraft Corp	***	***	***	***	***	***
Cessna Aircraft Co	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp	***	***	***	***	***	***
Piper Aircraft Co	***	***	***	***	***	***
Total or average	1,494,767	1,184,909	309,858	196,416	237,442	2/ 7.5

1/ ***.

2/ The calculation of the ratio of net operating profit to net sales excludes ***.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 9.--Profit-and-loss experience of U.S. producers on their commuter aircraft operations, by firms, 1977-81

Year and firm	Net sales	Cost of goods sold	Gross profit or (loss)	General, selling, and administrative expenses	Net operating profit or (loss)	Ratio of net operating profit or (loss) to net sales
	1,000 dollars					Percent
1977:						
Beech Aircraft Corp-----	***	***	***	***	***	***
Cessna Aircraft Co------	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp---------	***	***	***	***	***	***
Piper Aircraft Co-------	***	***	***	***	***	***
Total or average------	155,007	127,161	27,846	9,493	18,353	11.8
1978:						
Beach Aircraft Corp-----	***	***	***	***	***	***
Cessna Aircraft Co------	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp---------	***	***	***	***	***	***
Piper Aircraft Co-------	***	***	***	***	***	***
Total or average------	182,714	145,082	37,631	11,159	26,472	14.5
1979:						
Beech Aircraft Corp-----	***	***	***	***	***	***
Cessna Aircraft Co------	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp---------	***	***	***	***	***	***
Piper Aircraft Co-------	***	***	***	***	***	***
Total or average------	271,434	218,281	53,153	17,757	35,396	13.0
1980:						
Beech Aircraft Corp-----	***	***	***	***	***	***
Cessna Aircraft Co------	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp---------	***	***	***	***	***	***
Piper Aircraft Co-------	***	***	***	***	***	***
Total or average------	317,507	264,985	52,522	23,968	28,554	9.0
1981:						
Beech Aircraft Corp-----	***	***	***	***	***	***
Cessna Aircraft Co------	***	***	***	***	***	***
Fairchild Swearingen Aviation Corp---------	***	***	***	***	***	***
Piper Aircraft Co-------	***	***	***	***	***	***
Total or average------	364,651	291,316	51,705	27,107	25,730	7.1

1/ ***.
2/ ***.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 10.--Average number of employees in U.S. establishments producing commuter aircraft and all production and related workers directly engaged in the production of commuter aircraft, 1977-81

Item	1977	1978	1979	1980	1981
Average number of persons employed in reporting establishments:					
All persons	1/ 31,643	1/ 34,115	37,530	35,401	32,326
Production and related workers	1/ 21,116	1/ 22,515	25,534	23,526	20,533
Average number of persons employed in the production of commuter aircraft:					
All persons	3,467	4,262	5,181	2/ 5,586	4,804
Production and related workers	2,382	2,900	3,574	2/ 3,806	3,076

1/ Includes estimate of * * * employment.
2/ Data do not include * * *.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Barriers to entry into the industry.--The new entrant in commuter aircraft manufacturing faces several barriers. First, large amounts of capital are required to engage in such a venture. According to industry figures, approximately $100 million to $200 million (depending on the size of the plane) is required in nonrecurring costs to design, certify, and market aircraft. Additionally, there is a lengthy gap in the time that an airplane model is sold and the time that the manufacturer is able to recoup costs. Approximately 3 to 4 years are often required in order for an established manufacturer to design, market, and deliver an airplane. The time period required for a new project would most likely be even longer. As a general rule, a manufacturer needs to sell at least 200 aircraft of a given model to recover its development costs, although high interest rates may raise this breakeven point. 1/ The price is then initially based on the estimated cost of producing the aircraft years later. 2/ According to industry sources, only 5 to 7 percent of the selling price of each aircraft contributes to the amortization of the development costs. 3/

1/ U.S. Congress, Office of Technology Assessment, Impact of Advanced Air Transport Technology, 1982, p. 40.
2/ Robert Newhouse, "A Sporty Game, Betting the Company," The New Yorker, June 14, 1982, p. 66.
3/ ICF, Inc., Analyses of the Business Prospects of the CAC-100 Commuter Aircraft Program and the Commuter Aircraft Strategies of Major U.S. Manufacturers, June 28, 1982, p. 40.

Another barrier a new entrant to the industry must overcome is his "newness" in the market. In an industry where performance is such a critical concern, airlines must have confidence in the aircraft and its manufacturer. Commuter carriers are often hesitant to contract with a new manufacturer because they have no proven product support capabilities. Additionally, when an airline company places an order for new equipment with a manufacturer, it is assuming that the company will be able to stay in business and deliver the ordered aircraft. Once a producer fails to deliver a plane, the purchaser is forced to seek an aircraft from another manufacturer, and thus incur costly delays in improving its fleet.

Marketing of the aircraft.--Commuter airlines are the primary purchasers of commuter aircraft. All of the aircraft companies sell to these carriers in basically the same fashion. Initially, attempts to generate interest in the aircraft are made through articles and advertisements in trade journals. Additionally, a detailed sales campaign is planned that includes soliciting new purchasers and attempting to sell aircraft to purchasers that have already expressed interest in the product. In either case, salesmen direct their attentions to the presidents of the airlines, who typically make the purchasing decisions. When a manufacturer is attempting to solicit business for a new or existing airplane, the salesman will visit the airline and stress the virtues of the producing company, its reputation in the industry, the airplanes it is currently producing, and any future models. After the presentation is made, the salesman attempts to collect information on the routes served by the airline, the frequency of these routes, and the airline's cost factors. The data obtained will be carefully evaluated, and a detailed economic analysis will be done. Typically, the salesman will then make an appointment for a followup conference to present the analysis, or he will advise the prospective client that the report will be sent as soon as it is prepared. The route and economic analysis is the main sales tool used by commuter aircraft manufacturers. This report typically contains information on the direct costs of operating the company's aircraft over the airline's route structure. In some cases, the report also contains these statistics (as available) on competing aircraft. From this analysis, the salesman attempts to convince the carrier that his company's aircraft are best suited to the airline's present and future needs. Where an airline has directly contacted the company or has expressed its interest by filling out an "interest card" in a trade publication, a similar sales procedure is followed. However, under these circumstances, the manufacturer is usually able to prepare a route and economic analysis prior to the initial sales contact by solicting the necessary information by phone. Additionally, the salesman is able to focus his presentation on the specific plane in which the airline has expressed interest. In both the soliciting of new business and the marketing of aircraft to interested purchasers, a direct-mail program is instituted after the sales presentation is made. The potential purchasers are typically sent brochures, specifications, and press releases on a weekly or biweekly basis.

Airlines typically will solicit information from several manufacturers in order to make comparisons. Depending on the availability of aircraft in the particular size range, the airline often will initially look at six or seven

different commuter aircraft. A "short list" is prepared from this information. The short list is a tabulation of data on the few models of aircraft that will best fit the carrier's needs. At this point, negotiations regarding such factors as price, spare parts, training of pilots and mechanics, and, in some cases, financing of the aircraft are undertaken with the chosen manufacturers. Utilizing the negotiated offers, the airline then decides which aircraft to purchase.

According to industry sources, commuter aircraft manufacturers have found it difficult to sell airplanes to most commuter carriers in the past year, primarily due to an unstable economy, high interest rates, and a reduced rate of growth in commuter passenger traffic. Continuing depressed sales of these aircraft are being reflected in lower production rates, and, in some cases, are forcing layoffs. 1/

Domestic producers are also attributing a portion of the blame for decreased sales to alleged unfair import practices by some foreign manufacturers. In this regard, two countervailing duty complaints filed with the U.S. Department of Commerce and the U.S. International Trade Commission in 1982. The first complaint was filed by Commuter Aircraft Corp. on May 27, 1982, and alleged that the domestic industry was materially injured by reason of the sale of subsidized imported planes from France and Italy (inv. Nos., 701-TA-174-175). The U.S. International Trade Commission determined on July 7, 1982, that there was no reasonable indication that the U.S. industry was materially injured or threatened with injury, or that the establishment of an industry in the United States was materially retarded by reason of these imports. 2/ On August 13, 1982, Fairchild Aircraft Corp. filed a countervailing duty petition alleging that the U.S. industry was materially injured due to the importation of Brazilian commuter aircraft. On September 27, 1982, the Commission determined that there was no reasonable indication of such injury or threat thereof. 3/ These are the only investigations regarding commuter aircraft that have been filed under U.S. trade laws from 1977 to date.

Major foreign competitors

There are a number of foreign manufacturers that supply commuter aircraft to the United States. These firms include de Havilland of Canada, Embraer of

1/ David M. North, "General Aviation Sag Spurs Output Cuts," Aviation Week and Space Technology, Dec. 14, 1981, p. 23, and David M. North, "General Aviation Aircraft Deliveries Drop in April," Aviation Week and Space Technology, May 17, 1982, pp. 27 and 28.

2/ For views of the Commission in Certain Commuter Airplanes from France and Italy: Determination of the Commission in Investigation Nos. 701-TA-174 and 175 (Preliminary). . ., pp. 3-24, USITC Publication 1269, July 1982.

3/ For views of the Commission in Certain Commuter Airplanes from Brazil: Determination of the Commission in Investigation No. 701-TA-188 (Preliminary). . ., pp. 3-20, USITC Publication 1291, September, 1982.

Brazil, British Aerospace of the United Kingdom, Aerospatiale of France, Short Brothers of Northern Ireland, Fokker B.V. of the Netherlands, Dornier of West Germany, Government Aircraft Factories of Australia, Israel Aircraft of Israel, Pilatus Britten-Norman of Switzerland, and CASA of Spain. Additionally, there are three firms, Saab Scania, Nutranio, and Aeritalia, which are engaged in joint ventures with established firms in order to formulate their commuter aircraft industry. Most of the foreign manufacturers are wholly or partially owned by their respective governments.

Foreign manufacturers of commuter aircraft currently produce 12 different models of airplanes. Only 2 of these planes are in the 8- to 14-passenger capacity category. There are 5 models with 15- to 19-passenger capacity. None of these aircraft are pressurized. The remainder have seating capacity ranging from 27 to 50 passengers. Two of these five aircraft with 27- to 50-passenger capacity are pressurized. Additionally, these producers are developing eight new models of aircraft. The majority of these are pressurized aircraft with a seating capacity of 30 or more passengers. Foreign firms generally market their products in the same manner as domestic producers. The majority of foreign manufacturers produce other general aviation, military and/or corporate aircraft. An analysis of the foreign producers of commuter aircraft is provided in appendix C.

Foreign Trade

Tariff and international agreements

Commuter aircraft imported into the United States are classified for statistical purposes under a variety of import items, depending on the empty weight of the plane. The classifications according to the Tariff Schedules of the United States Annotated (1982) (TSUSA) are as follows:

TSUSA item No.	Article
	Airplanes, new, multiple engine:
694.4146--------	Less than 4,400 pounds empty weight.
694.4148--------	4,400 pounds and over but less than 10,000 pounds empty weight.
694.4155--------	10,000 to 33,000 pounds inclusive, empty weight.

The Agreement on Trade in Civil Aircraft, resulting from discussions in 1978 and 1979 at the Multilateral Trade Negotiations, provides for the elimination of all customs duties on civil aircraft and most parts and equipment of such aircraft. The United States, the European Community, Canada, Japan, Austria, Romania, Sweden, Switzerland, and Norway are signatories. 1/ It also provides for the reduction or elimination of a number

1/ Duty reductions are not limited to signatories to the agreements, since under the General Agreement on Tariffs and Trade (GATT), such reductions apply to all GATT member countries.

of nontariff barriers which have the effect of restricting trade in civil aircraft. 1/ As a result of this agreement, all imported aircraft from all countries, except certain Communist nations not entitled to most-favored-nation treatment, have entered the United States duty free since January 1, 1980. Prior to this date, the customs duty on commuter aircraft was 5 percent ad valorem for all countries with most-favored-nation status and 30 percent ad valorem for all Communist countries.

U.S. imports

Imports of commuter aircraft increased 281 percent in quantity and eleven-fold in value during 1977-81 (table 11).

Table 11.--Commuter aircraft: U.S. imports, by seating capacities, 1977-81 1/

Seating capacity	1977	1978	1979	1980	1981
	Quantity (units)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	21	19	46	86	80
	Value (1,000 dollars)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	17,152	18,920	69,727	156,170	205,794

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization, and any optional equipment.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The majority of these imports were planes with a seating capacity of 15 to 19 and 30 to 50 passengers. The largest increases in imports occurred in 1979; commuter airlines purchased new equipment to serve added markets because of deregulation. In many cases, these additional routes required the use of

1/ U.S. Congress, op.cit.

larger (over 30 passenger) aircraft. The purchasers report that foreign-made aircraft were generally purchased because there were no comparable U.S.-manufactured products available that adequately met the performance criteria required for short-haul markets in the 30- to 50-passenger category. 1/ There were no imports of commuter planes with seating capacities of 51 to 60 passengers during 1977-81. However, Aerospatiale of France is currently developing an aircraft with a capacity of 42 to 49 passengers which will be imported into the United States in 1984. According to information obtained from industry sources, there have been no imports from a U.S. company's foreign subsidiary, joint venture partner, or licensee from 1977 to date.

U.S. exports

U.S. exports of commuter aircraft increased 37.1 percent in quantity and 210.7 percent in value during 1977-81 (table 12.) Exports reached their highest quantity in 1979 at 221 units, before declining 2.7 percent in 1980 and 8.8 percent in 1981. Over * * * percent of U.S. exports of commuter aircraft are 8- to 14-passenger capacity. U.S. producers face virtually no international competition in this category. 2/

Exports represented 24.0 percent of total shipments in 1977 and 28.7 percent in 1981. Export sales are important to commuter aircraft manufacturers; the economies of scale involved with additional export sales can lower a firm's unit costs substantially, improve profitability, and thus increase competitiveness in the United States and abroad. Principal export regional markets for U.S.-manufactured commuter aircraft include South America and Australia.

1/ Transcript of the hearing in the matter of investigations Nos. 332-143 and 332-144, Sept. 28, 1982, pp. 51 and 86.

2/ Ibid., p. 6. There are only 2 foreign manufacturers who currently produce 8- to 14-passenger commuter aircraft: Government Aircraft Factories and Pilatus Britten-Norman. Both firms have had very limited success to date marketing their aircraft.

Table 12.--Commuter aircraft: U.S. producers' export shipments, by seating capacities, 1977-81 1/

Seating capacity	1977	1978	1979	1980	1981
	Quantity (units)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	143	180	221	215	196
	Value (1,000 dollars)				
8 to 14	***	***	***	***	***
15 to 19	***	***	***	***	***
20 to 29	***	***	***	***	***
30 to 50	***	***	***	***	***
51 to 60	***	***	***	***	***
Total	31,626	58,434	80,278	92,624	98,253

1/ Unit values within each seating capacity differ due to specific aircraft characteristics such as engines, avionics, pressurization, and any optional equipment.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The Current U.S. Market

Description of U.S. market

Commuter airlines (also known as regional airlines) are the predominant users of the aircraft covered in this report. 1/ Commuter airlines are those carriers which perform at least five round trips per week between two or more points and publish flight schedules which specify the times, days of the week, and airports between which such flights operate. 2/ The principal function of the short-haul air transportation system provided by commuter airlines has been to provide small- and medium-size communities with access to the nation's primary air transportation system. These carriers utilize a variety of aircraft, differing in size and capability, according to their route structure and passenger loads.

1/ The Regional Airline Association, whose membership transports approximately 90 percent of the volume of passengers carried by commuter airlines, testified before the Commission on Sept. 28, 1982.

2/ Regional Airline Association, 1981 Annual Report, Regional/Commuter Airline Industry, February 1982, p. 8.

The Civil Aeronautics Board (CAB) originally restricted commuter airlines to airplanes smaller than 12,500 pounds gross takeoff weight (about 19 passengers) for the express purpose of confining their operations to service that would not compete with larger airlines. As it became evident that these commuter carriers were not a threat to the major airlines, this limitation was changed in 1973 from an aircraft size limitation to a maximum payload limitation--either 30 seats or 7,500 pounds of cargo. Most airlines, however, preferred to continue utilizing smaller planes for several reasons. First, at this time, there were no modern aircraft available in the larger range that were specifically tailored to the economic and operational requirements of the commuter market. Additionally, the Federal Aviation Administration requires the addition of a cabin attendant for 20 or more seats, which adds another cost element for these carriers. More importantly, however, few commuter airline markets had the ridership or were financially able to support larger equipment in 1973. 1/

The Airline Deregulation Act is considered one of the single most important events in shaping the U.S. commuter airline industry. The act, passed in October 1978, formalized a number of significant changes in Federal policy and regulations aimed at making the air transportation system more efficient. The act made the smaller carriers eligible for Federal loan guarantees for aircraft purchases and also extended subsidy qualification to them under the CAB's Essential Air Service Program. 2/ Additionally, the act (coupled with subsequent action by the CAB) permitted commuter airlines to operate aircraft up to 60 passengers and 18,000 pounds cargo payload capacity. Another key component of deregulation allows airlines the opportunity to enter new markets or exit from those which are no longer economical. As a result of this provision, the major airlines withdrew from unprofitable markets to concentrate on longer, higher density markets. Commuter airlines quickly moved into these abandoned routes. The Airline Deregulation Act, however, did not totally deregulate the commuter airlines. In some aspects, these carriers operate in a more constrained regulatory environment than they did before 1978. For example, they must now comply with more stringent reporting requirements and operating regulations; pilots must now hold the highest level of FAA license, and even the smallest aircraft must meet much stricter safety requirements. The growth of the industry has continued despite the new regulations.

In general, the commuter airline industry is highly disaggregated. In 1977, there were 163 scheduled commuter airlines. By 1981, there were approximately 277, with the top 10 carrying 37 percent of all passengers and

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1/ U.S. Congress, op.cit., p. 21.

2/ U.S. Congress, op.cit., p. 31. The Essential Air Service Program, established under sec. 419 of the Deregulation Act, guarantees "essential air service" for 10 years to all eligible communities (those receiving certified service on the date of passage, or those whose authorized service had been suspended, a total of 555 communities). Under this provision, commuter carriers providing this service receive a subsidy payment in addition to the passenger fares. See Impact of Advanced Air Transport Technology, Office of Technology Assessment, Congress of the United States, 1982.

the top 50 carrying over 82 percent of total passengers transported. 1/ The largest commuter carriers are capable of operating aircraft fleets and providing services closely comparable with those offered by many major airlines. The industry also includes many small companies that operate 1 or 2 airplanes of less than 10 seats over a small number of routes. The largest commuter airlines have relatively sophisticated management and secure financing; the small commuter carriers are generally one-person operations and are more likely to be financially unstable. 2/

The number of passengers carried by these commuter airlines increased to 15.2 million in 1981, or by over 65 percent from the 1977 figure. There are a number of reasons for the rapid growth of commuter air service. First the speed and convenience of air travel are more attractive as incomes rise, and the rising number of businesses moving to small communities has also increased the demand for short-haul service. Second, the withdrawal of the larger airlines from smaller communities resulted in a faster growth rate for commuter airline ridership than normal growth in the demand for air service would produce. Less capital is required to acquire or lease the smaller aircraft appropriate to this type of service. Therefore, entry into the commuter airline industry has been relatively easy. Additionally, integration with the primary air transportation system has been improving in recent years; the major airlines, to whose longer routes the commuter carriers customarily feed passengers, have begun to share ticket counters, gate space, and baggage-handling and reservation service at a reasonable cost. 3/

The United States is the largest market in the world for commuter aircraft. There are currently over 1,443 commuter aircraft used by commuter carriers. Of this total, approximately 81 percent are aircraft with a seating capacity of under 20 passengers. 4/ However, there is a growing trend toward utilization of new larger (over 30-passenger capacity) turboprop aircraft by commuter carriers. Several aircraft manufacturers have formalized plans for development of new aircraft in this size range for the short-haul markets served by commuters. 5/

Factors influencing market demand

According to data received from the U.S. commuter airline industry, increased passenger traffic and route expansion were cited as the two primary factors influencing market demand. Other less important factors noted were passenger comfort, efficiency, the need to replace obsolete equipment, and the desire for more modern aircraft. Similar results were also found in a survey done by Forecast Associates in November 1981. 5/ In this study, operators

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1/ Regional Airline Association, 1981 Annual Report, Regional/Commuter Airline Industry, February 1982, p. 49.

2/ U.S. Congress, op.cit., p. 27.

3/ Ibid.

4/ Regional Airline Association, op.cit., p. 29.

5/ See app. A for information on specific aircraft under development.

cited expanded routes as the most significant factors, with increased frequency of flights and the need for larger capacity aircraft as additional determinants. Regarding factors which inhibited growth of the industry, commuter airlines singled out Government regulations as the major hindrances, with rising fuel costs running a close second. Unattractive financing and/or high interest rates on aircraft purchases were also cited as potential inhibitors. 1/

In 1981, high interest rates and an unstable economic environment caused U.S. commuter airline to experience their slowest period of growth since deregulation in 1978. Both of these factors significantly influence new-equipment decisions. High interest rates affect commuter airlines especially, because most of their aircraft loans are tied to the prime interest rate. Additionally, there is a shortage of money available to commuter operators to finance new planes. Potential investors often must evaluate the average commuter carrier's high debt-to-equity ratio against growth potential before investing in commuter aircraft. 2/ According to industry sources, commuter carriers historically need 6 to 8 months of prosperity before they are willing to make a commitment to purchase new equipment. 3/

Apparent U.S. consumption

The quantity of apparent U.S. consumption of commuter aircraft increased annually during 1977-80 (table 13). Consumption gained 34.3 percent in this period, rising to 634 planes in 1980. Due to high interest rates and the slumping economy, U.S. consumption decreased 11.2 percent by quantity in 1981. The value of apparent U.S. consumption rose each year during 1977-81, from $140.5 million in 1977 to $482.6 million in 1981. The ratio of imports to apparent consumption reached 14.2 percent by quantity and 42.6 percent by value in 1981. The reason for the large difference in these ratios is the fact that a major portion of those aircraft imported into the United States are larger aircraft than those produced domestically, and thus have a much higher value.

1/ World Aerospace Weekly, Nov. 1981, p. 5.

2/ "Soft Commuter Market Ahead in 1982," Aviation Week and Space Technology, Nov. 9, 1981, p. 129.

3/ Michael Feazel, "Commuters Survive Recession, Aircraft Orders Drop" Aviation Week and Space Technology, Apr. 12, 1982, p. 29.

Table 13.—Commuter aircraft: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent U.S. consumption, 1977-81

(Quantity in units; value in thousands of dollars)

Year	Producers' shipments	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
			Quantity		
1977	594	21	143	472	4.4
1978	575	19	180	414	4.6
1979	768	46	221	593	7.8
1980	763	86	215	634	13.6
1981	677	80	194	563	14.2
			Value		
1977	155,010	17,152	31,626	140,536	12.2
1978	182,715	18,920	58,434	143,201	13.2
1979	266,434	69,727	80,278	255,883	27.2
1980	323,310	156,170	92,624	386,856	40.4
1981	375,087	205,794	98,253	482,628	42.6

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The large foreign percentage of apparent U.S. consumption is illustrated in figure 1. Virtually all commuter aircraft in the * * * category purchased by U.S. airlines in 1981 were produced domestically. Only in the * * * category is there aggressive competition between domestic and foreign manufacturers. Approximately * * * of * * * commuter aircraft purchased in the range of * * * in 1981 were supplied by foreign producers. None of the foreign-produced aircraft were pressurized. This ratio increased during 1977-81. Of the four new aircraft models in the * * * category available next year, three are foreign built. There are no aircraft currently produced in the United States in the 20- to 29- passenger category; U.S. consumption of aircraft in this capacity consists completely of imports. A similar situation is found in consumption of 30 to 50 passenger aircraft. In 1981, there were no U.S.-manufactured aircraft specifically built for the commuter market. The only U.S. offering was a modified corporate aircraft that was adopted by commuter airlines to serve commuter operation. The domestic share of total U.S. consumption of commuter aircraft in this category was less than * * * percent in 1981. There were no new aircraft utilized in the United States in 1981 with a seating capacity of 51 to 60 passengers.

Factors of Competition in the Market

Raw materials

Regarding the availability of the necessary raw materials to produce commuter aircraft, the domestic industry, in general, indicates that it is equally competitive with major foreign competitors. U.S. producers are normally able to obtain all components for the manufacture of the planes domestically at competitive prices due to established supplier relationships. Components are sometimes imported; however, this is usually by choice rather than of necessity. The majority of foreign manufacturers have been in existance long enough for similar relationships in their home markets to evolve. However, certain components, such as landing gears and avionics, are usually obtained from the United States.

Labor costs

Generally, the U.S. commuter aircraft industry indicates that it has a competitive advantage regarding labor costs because of the existance of a skilled labor force. There is a general rule that with every doubling of the number of airplanes produced, a 25-percent reduction in direct labor costs is achieved. 1/ Since the U.S. industry has been in existence longer than most foreign manufacturers, and the functions performed by employees are similar for all commuter aircraft, total labor costs for U.S. producers should be lower than their foreign counterparts. Additionally, since many foreign manufacturers are either wholly or partially state owned, stable employment is an important objective in the industry. Thus, when orders for new aircraft decline, employment is not always reduced accordingly, and the foreign manufacturer is forced to absorb excess labor costs. U.S. producers are more

1/ Robert Newhouse, op.cit., p. 60.

Figure 1.--Commuter aircraft: Apparent U.S. consumption by domestic and foreign sources, 1981.

* * * * * * *

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

flexible, and large layoffs during periods of decreased orders are standard industry practice. The U.S. industry notes, however, that wages paid in the United States are somewhat higher than those in foreign countries. 1/

Capital formation

In the area of capital formation, the U.S. commuter aircraft producers strongly assert that they are at a competitive disadvantage compared with foreign manufacturers. As stated earlier in this report, foreign producers are frequently owned wholly or in part by their respective governments. These producers are often able to obtain capital in the form of loans, grants, or loan guarantees provided by the national government to develop, improve, market, and finance their products. American firms must depend on the commercial market for these funds.

Quality

According to data received in response to industry questionnaires, U.S. producers believe that U.S.-manufactured commuter airplanes are equal or superior to foreign products technologically. U.S. advantages noted by the industry include pressurization, fuel efficiency, and speed. However, commuter airline operators have contradicted this assessment, saying that domestically produced planes are derivations of corporate aircraft and are not totally suited for commuter use. The operators specifically criticized engine deficiencies and maintenance problems. Because the aircraft used in commuter airline operations fly more frequently than corporate airplanes, they must be more durable. Many foreign aircraft are adaptations of military planes and are more ruggedly built. 2/

Price

The imported aircraft are marketed in the U.S. in the same manner as the domestic products. Price is sometimes used as an entry strategy for foreign commuter aircraft. Generally, similar aircraft (i.e., same seating capacity and engine and airframe technology) are comparably priced whether they are produced domestically or offshore. A complete listing of 1981 prices of commuter aircraft currently being marketed and underdevelopment is shown in appendix A.

1/ Data submitted in response to questionnaires of the U.S. International Trade Commission.

2/ Transcript of the hearing in the matter of investigation Nos. 332-143 and 332-144, Sept. 28, 1982, pp. 99-102 and 110-115.

Foreign Export Credit Subsidies and Their Impact on the U.S. Industry

The types of credit programs provided by most countries to encourage the export of commuter aircraft are the same as those used to finance all exports. Details regarding official export credit programs can be found in the section entitled "Export Credit Subsidies."

The financing of aircraft purchases

Since 1977, according to responses to Commission questionnaires, the financing of commuter aircraft has changed significantly. As bank loans have become more costly and more difficult to obtain, and leasing and seller financing have become much more common. Foreign manufacturers, in particular, are offering seller financing to commuter airlines, and at the same time, loan guarantees offered by foreign governments are growing in significance.

Foreign manufacturers often offer favorable financial terms, which significantly reduce the costs of purchasing foreign commuter aircraft as indicated in questionnaire responses. The effect of these terms depends on the specific terms offered and the market credit terms available to the purchaser.

Sources of financing.--Between 1977 and 1981, commuter airlines significantly changed their methods of financing aircraft purchases. As table 14 shows, in 1977 and 1978, commercial bank loans were the most widely used source of financing; since then, leasing and seller financing have increased in importance. 1/ In 1980 and 1981, leasing from private investors was the most widely used method of financing aircraft, and bank loans were second. However, seller financing was almost as popular as bank loans.

1/ An earlier study confirms that bank loans were the most important source of long-term financing for commuter airlines in the early years of this period. Federal Aviation Administration, "Commuter Air Carrier Loan Guarantee Study," report prepared by The Aerospace Corp., DOT-FA79WA1-010, Jan. 1980, p. 37.

Table 14.--Commuter aircraft: Sources of aircraft financing and number of aircraft purchasers identifying each source, 1977-81 1/

Source	1977	1978	1979	1980	1981
Banks	12	8	9	8	8
Sellers	2	3	5	7	6
Insurance companies	1	1	2	3	5
Leasing 2/	4	6	7	14	11
Other	1	0	2	4	3

1/ Some purchasers identified more than 1 source of financing in each year.
2/ Includes lease-purchase agreements.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The change in aircraft-financing methods seems to have been caused by several factors. Banks have been reluctant to lend money to the airlines recently because of the air transport sector's poor financial performance. High interest rates have made it particularly difficult for airlines to use bank financing. Leasing can have significant tax benefits, because it can shift interest costs from unprofitable to profitable firms. The profitable firms are better able to take advantage of the tax deductibility of interest costs. Recent legislation has made it easier to gain tax benefits through leasing. Furthermore, higher interest rates increase the importance of the tax deductibility of interest costs; poor airline profits make shifting these costs from airlines to lessors more desirable. 1/

As bank loans have become more difficult to get and more costly, both foreign and domestic producers of commuter aircraft have increased seller financing. Foreign producers, however, have more widely adopted seller financing than domestic producers. Domestically produced aircraft are still often sold without seller financing. At least one major domestic producer, * * *, offers no seller financing at all. 2/ Foreign producers of commuter aircraft almost always use seller financing. From 1980 to 1982, 13 of the 15 sales of foreign-made commuter aircraft for which detailed information on financing are available were financed with assistance either from the seller or from the official export credit agency of the seller's country. 3/

1/ Both domestic and foreign aircraft are leased. The lessor is almost always a domestic corporation. Financing terms can influence the competition between aircraft, even if the airline leases the plane from a domestic lessor, because if the lessor's purchasing costs are reduced by an attractive financing package, it will be able to pass those savings on to the airline by lowering the lease payments.

2/ * * *.

3/ * * *.

Sources of guarantees.--Loan guarantees can have an important effect on interest costs. A loan guarantee is a promise by a creditworthy entity to repay a loan if the borrower defaults. Because a loan guarantee can significantly reduce the risk that a lender will not be repaid, it may greatly reduce the interest rate the lender charges on the loan.

Foreign export credit agencies often offer loan guarantees to reduce purchasers' interest costs. Foreign loan guarantees have grown in importance in the U.S. commuter aircraft market, (table 15). From 1977 to 1979, the U.S. Government was commuter airlines' primary source of loan guarantees; in 1980 and 1981, foreign governments were as significant a source of guarantees as was the U.S. Government.

The majority of U.S. Government loan guarantees are granted by the Federal Aviation Administration (FAA). These loans are available on purchases of both domestic and foreign aircraft. During 1977-81, the FAA guaranteed loans worth $89.9 million; 62.9 percent of this amount was used to purchase foreign aircraft. 1/ A second program used by commuter airlines is the Business and Industry Loan Program administered by the Farmers Home Administration, U.S. Department of Agriculture. Since 1978, more than 19 commuter airlines have obtained guarantees, totaling almost $42 million. 2/

Table 15.--Commuter aircraft: Sources of loan guarantees, and number of purchasers identifying each source, 1977-81 1/

Source	1977	1978	1979	1980	1981
Sellers	1	0	1	2	1
U.S. Government 2/	3	1	5	6	5
Foreign governments	1	1	3	6	5
Other	2	4	3	4	1

1/ Purchasers were permitted to identify more than 1 source.
2/ All U.S. Government guarantees are from the Federal Aviation Administration, except for 2 in 1977.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

1/ In January-July 1982, the FAA guaranteed an additional $3.8 million in loans. The amount of the 1982 loans used to purchase foreign aircraft is unknown. The FAA loan guarantee program received no funding for fiscal year 1983, which began on Oct. 1, 1982. However, 50 million dollars' worth of funding for fiscal year 1982 is still available for use in 1983. Letter of Edward W. Stimpson to Kenneth R. Mason, Oct. 6, 1982.

2/ Ibid. Airlines may use Farmers Home Administration guaranteed loans for purposes other than buying aircraft.

<u>Credit terms available on domestic aircraft</u>.--Purchasers generally finance domestic aircraft at interest rates that are from 0.5 to 2 percentage points above the prime rate, the rate commercial banks charge their most creditworthy borrowers. From 1977 to 1981, the prime rate rose substantially and became increasingly volatile. The range of prime rates seen in each year is shown in table 16.

Table 16.--Interest rates: Minimum and maximum prime rates, January 1977-August 1982

(In percent)

Period	Minimum	Maximum
1977	6.25	7.75
1978	8.00	11.75
1979	11.75	15.50
1980	11.00	21.50
1981	15.75	20.50
1982 January-August	13.50	16.50

Source: Morgan Guaranty Trust Co., <u>World Financial Markets</u>, various issues.

U.S.-manufactured aircraft are still commonly purchased using market financing. The most creditworthy commuter airlines are able to obtain bank financing at interest rates from 0.5 to 1.5 percentage points above the prime rate. Less creditworthy airlines pay higher interest rates--as much as 6 percentage points over the prime rate. 1/ Commuter aircraft are also often purchased by leasing companies; these firms generally pay interest rates no more than 2 percentage points above prime. Before 1979, interest rates on aircraft purchases were generally fixed for the life of the contract; since then, these rates have usually fluctuated with the prime rate. Usually, from 80 to 90 percent of the aircraft is financed, and the term of the loan ranges from 7 to 12 years.

Financing of domestic aircraft under an FAA loan guarantee usually carries an interest rate of 0.5 to 1 percentage point over the prime rate. This rate is commonly fixed for the life of the contract. The fee for an FAA-guaranteed loan is 0.25 percentage point and is paid by the lender. No more than 90 percent of the aircraft's cost may be financed under an FAA-guaranteed loan. The terms of these loans are usually slightly longer than the terms of loans without guarantees.

1/ Ibid. Prime plus 6 percentage points is the highest rate paid by air carriers on bank loans according to a recent survey. An executive of one commuter airline testified that in 1981, when the prime rate varied from 15.75 to 20.5 percent, his average interest rate was 19.5 percent. Testimony of Mr. William Britt, Sept. 28, 1982, transcript of the hearing, p. 103.

Information is available on seller financing offered by one domestic manufacturer, Beech. This information is shown in table 17. Beech has given some, but not all, purchasers financing at below market interest rates for the first year of their contract. For subsequent years, the interest rates Beech offers are at approximately the same level as market interest rates.

Table 17.--Commuter aircraft: Terms of financing offered by Beech, October 1981-March 1982

Date of financing	Prime rate	Interest rate		Term of loan
		First year	Subsequent year	
	Percent			Years
October 1981	18.00	15	Prime + 1.5	8
December 1981	15.75	18 1/	Prime + 1	8
December 1981	15.75	18 1/	Prime + 1	8
December 1981	15.75	15	Prime + 1.5	8
December 1981	15.75	Prime + 1	Prime + 1	8
February 1982	16.50	18	18	6
March 1982	16.50	15	Prime + 1	9

1/ This rate is for 6 months only.

Source: Data were taken from official records of the FAA by Avmark Inc. and presented in "Financing of Aircraft: The Need of a Package," Respondent's exhibit 5, presented at the hearing in investigation No. 701-TA-188 (Preliminary), Sept. 8, 1982, except for data on the prime rate, which are from Morgan Guaranty Trust Co., World Financial Markets, various issues.

Credit terms available on foreign-built aircraft.--Information is available about credit terms offered on purchases of several foreign aircraft. Present-value analysis was used to determine the extent to which typical terms of financing reduced the cost of purchasing these aircraft. The present value is the price of the aircraft adjusted to reflect the value of financing concessions. The extent to which export credits reduce the purchasers' costs can be found by comparing the present value of the contract with the aircraft's price. 1/ Because market interest rates vary with the creditworthiness of the purchaser at the time the loan is made, these calculations are done using three different market interest rates: 14, 16, and 20 percent.

The most generous financial terms were those offered on the * * *. The terms typically offered reduce the cost of a * * * by 12.5 percent to 25.0 percent. The least generous terms were those offered on the * * *. These

1/ Present-value analysis is briefly described in app. D.

terms reduced the cost of a * * * by from 1.9 to 18.3 percent. On the other planes considered, export credits reduced their costs by from 6.7 to 23.0 percent. The effects of financing on the cost of four foreign aircraft are summarized in table 18.

The savings due to favorable terms of financing are somewhat reduced, because interest costs are tax deductible. The results of present-value calculations that take into account the tax treatment of interest payments are in table 20. 1/ These results indicate that even considering the effects of taxes, favorable financing terms significantly reduce the cost of foreign aircraft. The cost of the * * * was reduced by 9.6 percent to 18.3 percent. The cost of the * * * was reduced by from 1.4 percent to 15.0 percent. The cost of the other planes considered was reduced by from 5.3 percent to 18.8 percent.

Information concerning the financing terms offered on aircraft from four different foreign countries is summarized below.

* * * * * * * 2/

* * * * * * * 3/

1/ The effect of taxes was included in the present-value calculations by deducting 30 percent of each interest payment from each total payment to represent the value of the tax deduction and by multiplying the market interest rates by one minus the tax rate. The marginal tax rate paid by the typical purchaser of commuter aircraft is unknown; a 30-percent tax rate was used in another study, sponsored by one importer of foreign aircraft. E. M. Kaitz, "Aircraft Financing," respondent, exhibit 2, transcript of the conference on inv. No. 701-TA-188, Sept. 8, 1982.

2/ These terms come from questionnaire responses of three purchasers. A fourth purchaser reported similar terms in 1979. A study done by a domestic producer based on records of the Federal Aviation Administration supports the finding that an 8.5-percent interest rate is typical of Bandeirante financing. Of 27 contracts where data were available, 16 carried an 8.5-percent interest rate; 6 carried a 7.5-percent interest rate; 4 carried an 8.0-percent interest rate; and 1 carried a 7.75-percent interest rate. Petition of Fairchild Aircraft, docket 862, investigation No. 701-TA-188 (Preliminary), Aug. 13, 1982.

3/ * * *.

* * * * * * *

* * * * * * *

Table 18.--Commuter aircraft: Effects of financing on the cost of purchasing aircraft, by countries, 1982

* * * * * * *

Table 19.--Commuter aircraft: Effects of financing on the after-tax cost of purchasing aircraft assuming a tax rate of 30 percent, by countries, 1982

*   *   *   *   *   *   *

Sales experience of the U.S. industry, January 1977-September 1982

(Information contained in the following section is alleged by the domestic commuter aircraft industry. Data received from U.S. purchasers of commuter airplanes do not substantiate these claims.)

Volume of lost sales.--According to data received in response to industry questionnaires, domestic producers of commuter aircraft indicate that they lost a number of U.S. sales during January 1977-September 1982 due to export credit financing. Lost sales in the industry, as noted by two producers, 1/ are listed in the table 20.

Table 20.--Commuter aircraft: Lost sales, by seating capacities, 1977-81 and January-September 1982

Seating capacity	1977	1978	1979	1980	1981	Jan.-Sept. 1982
* * *	***	***	***	***	***	***
* * *	***	***	***	***	***	***
Total	***	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

These sales amounted to an average of less than * * * percent of total U.S. deliveries of commuter aircraft during 1977-81. However, the majority of these alleged lost sales are for planes with * * * capacity during 1977-81. These lost sales, as a percentage of total U.S. deliveries of planes in this category, represented * * * percent of total deliveries in 1978, * * * percent in 1979, * * * percent in 1980, and * * * percent in 1981. Domestic producers indicate that these sales were lost to aircraft manufacturers in * * * and * * *, which offer export credit financing at below market rates.

Impact of lost sales.--The U.S. commuter aircraft industry contends that the increased offering of below-market financing by foreign manufacturers is the reason for their declining sales, employment, and profits. The commuter airline industry disagrees with this analysis, stating that foreign export financing did not cause displacement of any domestic sales.

1/ Only * * * and * * * provided statistical data on lost sales. * * * indicated that due to the existance of below-market financing, their sales were lost to foreign aircraft in the * * *-passenger capacity. * * * indicated that they had lost sales due to export financing, but did not provide specific details. * * * and * * * indicate that they did not lose any sales in this period.

U.S. commuter aircraft industry perspective.--According to data received in response to industry questionnaires, several manufacturers feel that they have lost a significant number of commuter airplane sales due to export credit subsidies. A case study detailing an alleged lost sale due to export credit financing can be found in app. E. The impact on certain industry indicators, if these sales had not been lost, is listed in table 21.

Table 21.--Commuter aircraft: Impact of lost sales on certain industry indicators, 1978-83

Item	1978	1979	1980	1981	1982	1983
Production added----------units--	***	***	***	***	***	***
Employment added:						
All persons--------------------	***	***	***	***	***	***
Production and related---------	***	***	***	***	***	***
Research and development expenditure-------1,000 dollars--	***	***	***	***	***	***
Profit before taxes added-----------1,000 dollars--	***	***	***	***	***	***
Investment added-----------do----	***	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

* * * did not feel that they had lost any sales to foreign manufacturers due to the availability of more favorable financing arrangements. * * * currently manufactures commuter aircraft with * * *. In this category there is only * * * foreign competitor, and * * * had only limited success in the U.S. market. * * *.

The majority of the lost sales were to aircraft manufacturers in * * * and * * *. Regarding financial arrangements offered by * * * of * * *, domestic producers indicate that airlines are offered interest rates of * * * to * * * percent for loan terms of approximately 8 years, * * * required, and grace periods of up to * * * months prior to the initial loan payment. * * *, of * * *, allegedly offered * * * percent financing to U.S. purchasers of its * * *- seat aircraft. Industry sources indicate that although there is * * *. Because the monthly cost of owning foreign aircraft is lower due to export credit financing, the corresponding cost per seat-mile is less. Therefore, an

airline can purchase a larger, more expensive airplane than originally planned. * * *.

*   *   *   *   *   *   *

U.S. commuter airline industry perspective.--Although export credits are attractive to U.S. airline operators, other criteria are considered more important to those operators in deciding on an aircraft to purchase. In the Commission's questionnaires, purchasers were asked to rank the criteria used in making their aircraft-purchasing decision. Those criteria, and the results of the airline opertor's responses, are shown in table 22. The financial package offered by aircraft producers ranked as the 10th most important criteria considered when purchasing a commuter aircraft. Most important, in descending order, are passenger capacity, fuel efficiency, quality, technology, and price. Operators allege that not only is financing an unimportant decision factor, but that it is not even discussed until negotiations are almost concluded. 1/

1/ Transcript of the hearing in investigations Nos. 332-143 and 332-144, Sept. 28, 1982, pp. 54, 187, and 188.

Table 22.--Weighted ranking of selected criteria in the purchasing of commuter aircraft

Ranking 1/	Criteria	Number of purchasers selecting criteria		
		Most important	2d most important	3d most important
1	Passenger capacity-----------	5	3	3
2	Fuel efficiency-------------	-	4	7
3	Quality---------------------	4	2	3
4	Technology------------------	8	1	-
5	Price-----------------------	2	5	1
6	Technical and service support-------------------	1	2	-
7	Fleet standarization---------	1	2	-
8	Engine characteristics-------	-	-	2
9	Availability-----------------	2	2	2
10	Financial package------------	-	1	3
11	Reputation-------------------	-	2	1
12	Range------------------------	1	1	1
13	Seat/mile cost---------------	1	-	-
14	Pressurization---------------	-	1	-
15	Speed------------------------	-	1	-

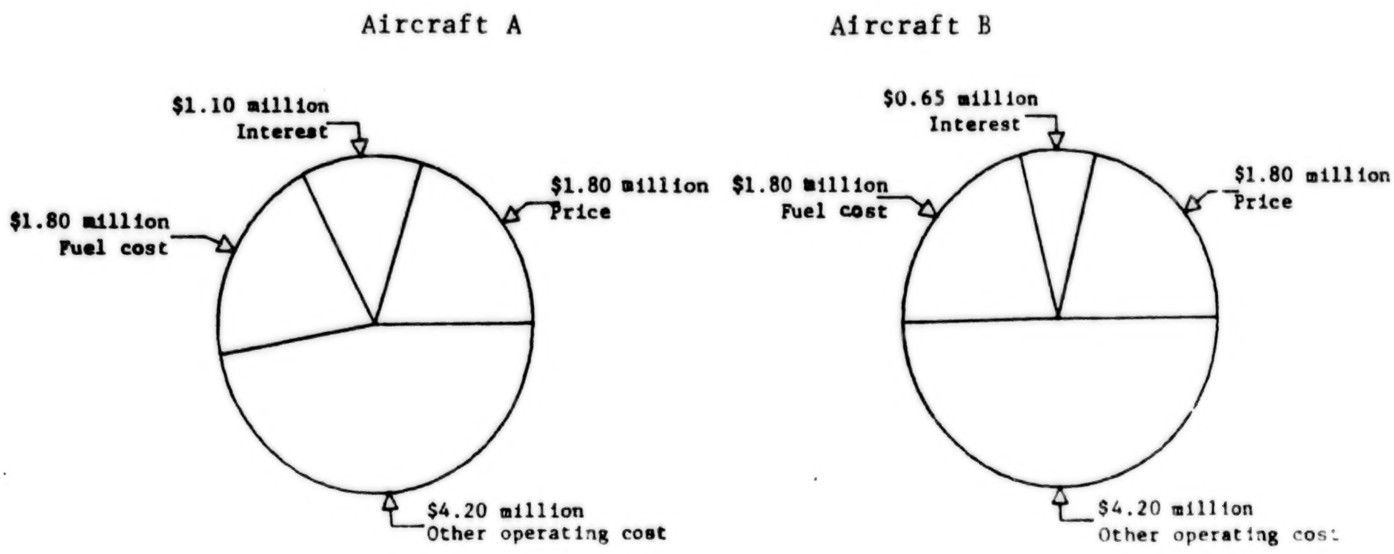
1/ Overall ranking based on the questionnaire responses of U.S. commuter airline companies.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Impact on U.S. commuter airline industry.--Export credit subsidies provided by foreign governments to their commuter aircraft manufacturers have benefited U.S. airline companies, permitting annual interest savings, in certain instances, of up to $100,000 per aircraft. This savings, to the extent that foreign commuter aircraft are purchased by U.S. companies and to the extent that subsidized aircraft credits are used, has had an impact on U.S. commuter airlines. The effect of subsidized export credits applied to a commuter aircraft offering in the United States are shown in the figure 2. The graphs are based on hypothetical offerings of two competing identical aircraft--one receiving subsidized financing at the rate of 10 percent and the other offered at a commercial rate of 16 percent. The relationship of the

operating cost components for commuter aircraft are based on actual experiences provided in response to U.S. International Trade Commission questionnaires. 1/ Without subsidized financing, interest costs are 12 percent of total operating costs. As demonstrated in the graphs, the financing package does alter significantly the cost to the purchaser of operating the aircraft. In this example, choosing aircraft B would save the purchaser more than $450,000 in interest, or about $64,000 annually during the loan period. Interest savings would be larger on a more expensive aircraft.

Figure 2.--Effects of subsidized export credits applied to U.S. commuter aircraft.



Price------------	$1.8 million	Price------------	$1.8 million
Amount financed--	$1.6 million	Amount financed--	$1.6 million
Interest rate----	16 percent	Interest rate----	10 percent
Years financed---	7 years	Years financed---	7 years
Operating life---	10 years	Operating life---	10 years
Total operating cost-----------	8.9 million	Total operating cost-----------	8.4 million

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

1/ The relationship of the cost components are based on an average of typical operating experiences, as reported by domestic commuter airlines.

Potential employment/production impact of lost sales to imports

In 1981, the domestic industry alleged lost sales of * * * aircraft due to credit subsidized imports from * * *. 1/ These sales were valued at * * * million; this figure was used as the estimate of the change in production due to credit subsidies. The loss of * * * million in domestic commuter aircraft production is estimated to displace * * * million in domestic production and * * * workers, as shown in table 23.

The effect of this decrease in U.S. aircraft manufacturing on production in other U.S. industries was estimated using the input-output model of the Bureau of Labor Statistics (BLS). The BLS model represents the best available method of estimating these effects; however, certain reservations must be kept in mind when using the BLS model. The coefficients used in the model were estimated using 1977 data, and they have not been adjusted for the effects of technological change that took place between 1977 and 1981. The BLS model double counts certain products when determining the total value of output lost. For example, the value of steel used in an aircraft part is counted both separately and because it is included in the value of the parts. This double counting will inflate the estimate of lost output, but will not affect the estimate of the lost employment.

Table 23.--Effects of a loss of * * * million of U.S. commuter aircraft production on domestic employment and output, 1981

Industry sector	Employment lost	Output lost
	Number	Million dollars
Aircraft	***	***
Other manufacturing	***	***
Other	***	***
Total	***	***

1/ Due to the nature of the BLS input-output model, certain components of aircraft are double counted; therefore the "output lost" data is overstated.

Source: Estimated by the staff of the U.S. International Trade Commission.

The estimates in table 23 ignore the effect of imports of aircraft on U.S. exports of aircraft parts. Additionally the data assumes that an increase in imports due to export credit subsidies leads to an equal decrease in domestic production. Thus, they may overestimate the effect of these subsidies on U.S. industry. Estimates in appendix F indicate that an increase in imports reduces domestic aircraft production by only * * * percent of the increase. These estimates suggest that a * * * million increase in imports leads to a * * * million decline in domestic production. A * * * million

1/ Another domestic producer, * * *, also said that it lost sales because of export credit subsidies, but did not estimate the volume of those lost sales.

decline in domestic U.S. commuter aircraft production will displace * * * million in domestic production and eliminate the jobs of * * * workers, as shown in table 24.

Table 24.--Effects of a * * * million loss of U.S. commuter aircraft production on domestic employment and output, 1981

Industry sector	Employment lost	Output lost
	Number	Million dollars
Aircraft	***	***
Other manufacturing	***	***
Other	***	***
Total	***	***

1/ Due to the nature of the BLS input-output model, certain components of aircraft are double counted; therefore the "output lost" data are overstated.

Source: Estimated by the staff of the U.S. International Trade Commission.

Likely Future Trends in the U.S. Market

Commuter airline passenger boardings grew at an annual average rate of 14 percent during 1977-81. Due to the downturn in the economy, however, the rate of growth declined substantially in 1980 and 1981. 1/ Nonetheless, industry marketing specialists forecast a yearly average increase of 10 percent in passengers carried through 1990 --approximately 40 million passengers compared with 15 million in 1981. 2/ Because of increasing traffic expanding route systems, and spiraling operating costs, commuter airlines anticipate the need to replace older, expensive-to-maintain, piston aircraft and older, less-fuel-efficient, turboprops. Information obtained from industry questionnaire responses indicates that in the next 5 years most airlines anticipate replacing these older aircraft with 30- to 50-passenger aircraft (table 25).

1/ Regional Airline Association, op.cit., p. 7.
2/ "Industry Experts Bullish on U.S. Future in Commuter Plane Market," Commuter Air, February 1981, p. 15.

Table 25.--Commuter aircraft: U.S. commuter airlines' future contract awards for domestic and foreign aircraft, by seating capacities, 1982-86

Year	8 to 14	15 to 19	20 to 29	30 to 50	51 to 60	Total
1982	***	***	***	***	***	***
1983	***	***	***	***	***	***
1984	***	***	***	***	***	***
1985	***	***	***	***	***	***
1986	***	***	***	***	***	***
Total	***	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Industry forecasts of future demand for commuter aircraft vary widely; however, there is a general consensus that the major market for these aircraft will continue to be in the United States. During 1980-2000, worldwide demand for 12- to 60-passenger commuter aircraft 1/ has been estimated by manufacturers, suppliers, and government agencies. These estimates are listed in the following tabulation: 2/

Source of estimate	Airplanes
Aerospatiale	***
British Aerospace	***
Dowty Rotol	***
Federal Aviation Admin	5,398
Office of Technology Assessment	4,600
Fairchild Swearingen	***

Industry sources indicate that the potential U.S. market for new commuter aircraft in this period is 2,500 planes. 3/ Aircraft with a seating capacity over 30 passengers have been identified in various market studies as the fastest growing segment of this anticipated demand. In 1980, there were approximately 200 aircraft with passenger capacity greater than 20 in service by U.S. commuter airlines. This number is expected to increase dramatically in the next decade as more aircraft of that size become available. 4/

1/ No estimates are available for airplanes in the 8 to 11 seat range.
2/ Information compiled from various industry and business publications and from personal interviews.
3/ U.S. Congress, op.cit., p. 40.
4/ Ibid.

In spite of these projections, most U.S. producers appear reluctant to increase their activity in the commuter aircraft market. 1/ Of the 12 models of aircraft currently under development (see app. A for list), four involve U.S. companies. The future of two of these airplanes, the 404 Ahrens and the CAC 100, is in doubt. (Ahrens Aircraft Corp. did not deliver any of its Ahrens 404 aircraft before going to bankruptcy proceedings. As of September 1982, Commuter Aircraft Corp. had no orders for its CAC 100 airplane.) The SF 340 is to be produced by a joint venture between Fairchild Aircraft Corp. and Saab Scania of Sweden, partly produced in Sweden and the U.S. The only aircraft under development independently by a U.S. firm is the Beech 1900, a 19-seat airplane.

In the segment of the commuter market expected to grow most quickly (airplanes of 30- to 50-passengers) there are 8 airplanes currently under development. Three of these aircraft involve U.S. firms. However, as noted above, only one project, the SF 340, is considered by industry sources to be a serious competitor. Because of the small number of U.S. planes offered in this market segment, imports are expected to obtain an even larger share of U.S. consumption of commuter aircraft.

In the absence of increased U.S. production of 30- to 50-passenger aircraft, the U.S. market for such aircraft will be supplied by imports. Based on 1981 production/employment relationships, each $100 million in production of commuter aircraft (as well as all aircraft) not undertaken by U.S. firms translates into an estimated $210 million in lost production opportunities in all sectors of the U.S. economy and 2,700 jobs not created. 2/ In the aircraft sector alone, about $118 million in potential production is lost, along with approximately 1,360 jobs. The estimated effects on the entire U.S. economy, assuming lost production opportunities of $100 million, summarized in table 26.

Table 26.--Civil aircraft: Effects of $100 million loss in U.S. production of aircraft on the output and employment in all U.S. industry sectors

Industry sector	Employees lost	Output lost
		Million dollars
Aircraft	1,363	118
Other manufacturing	596	55
Other	764	37
Total	2,723	210

Source: Estimated by the staff of the U.S. International Trade Commission.

1/ U.S. Congress, op.cit., p. 40.

2/ These estimates are based on the BLS input-output model. In the BLS model, certain components of aircraft are double counted; therefore, the "output lost" data are overstated.

Medium- and Large-Transport Aircraft

The Structure of the U.S. Industry and That of Major Foreign Competitors

Product description

Medium transports, as defined in this study, are pressurized civil airplanes, powered by turbojet or turbofan engines, having a seating capacity of 61 to 120 passengers and a maximum range of 2,199 statutory miles. Medium transports are standard/narrow body (single aisle) planes. Aircraft which are classified as medium transports include the Fokker F-28, British Aerospace BAe-111 and BAe-146, Boeing 737 series, and McDonnell Douglas DC9-30. Large transports are defined as pressurized civil airplanes utilizing turbojet or turbofan engines, with a range exceeding 2,200 statutory miles and a seating capacity of 121 or more passengers. Large-transport aircraft can be either wide body (two aisles) or standard/narrow body (single aisle). Additionally, from the original design of either a medium- or large-transport, many derivatives are made. The original design is typically modified in several ways: "stretching" the aircraft, 1/ increasing fuel capacity by reducing passenger capacity (for greater range), and changing the engines. An aircraft's useful life is estimated to be about 18 years. There are currently 14 models of medium-range (2,200 to 3,799 statutory miles) large-transport aircraft and long-range (over 3,800 statutory miles) large-transport aircraft in production worldwide. Additionally, nine new models are under development, and they are expected to begin service in the mid-1980's. A listing of these current and future models, along with information about each model, is provided in appendix A.

U.S. industry

There are three U.S. producers of medium- and large-transports aircraft--the Boeing Co., McDonnell Douglas Corp. and Lockheed Corp.. The domestic industry currently manufactures 16 medium- and large-transport aircraft. The majority of these are large transports with a seating capacity exceeding 200 passengers. Lockheed Corp., however, recently announced that they will cease production of their only commercial aircraft, the L1011, in 1984. These three manufacturers together accounted for about 69 percent of total worldwide shipments in 1981, down from 80 percent in 1980. More detailed information concerning the three U.S. aircraft producers is provided in appendix B.

1/ Lengthening the fuselage by the addition of sections in front of and behind the wings to increase capacity.

U.S. shipments.--Total shipments of U.S.-produced medium and large transports increased from 154 units in 1977 to 379 units in 1981, or by 146.1 percent. During 1977-80, the value of shipments increased almost threefold, rising from $2.6 billion in 1977 to $9.9 billion in 1980. These shipments fell 2.0 percent in 1981, to $9.7 billion (table 27).

Table 27.--Medium- and large-transport aircraft: U.S. producers' shipments, 1/ by seating capacities, 1977-81

Item	1977	1978	1979	1980	1981
Medium transport:					
61 to 80-----------seats----:	-	-	-	-	-
81 to 99----------------do--:	16	20	39	25	77
99 to 120---------------do--:	25	40	77	92	100
Large transport:					
Medium range:					
121 to 170 seats--------do--:	67	118	136	131	94
171 to 220 seats--------do--:	-	-	-	-	-
221 to 300 seats--------do--:	4	26	50	65	47
Long range:					
121 to 170 seats--------do--:	3	3	1	-	-
171 to 220 seats--------do--:	-	-	-	-	-
221 to 300 seats--------do--:	-	-	-	-	-
301 to 400 seats--------do--:	20	32	67	73	53
Over 400 seats----------do--:					
Total industry:					
Aircraft------- --number----:	155	239	370	386	379
Value--(billion dollars)----:	$3.2	$4.2	$8.0	$9.9	$9.7

1/ Includes domestic shipments and exports.

Source: Aerospace Industries Association, Aerospace Facts and Figures 1981/82.

The Boeing Co. accounted for 67.3 percent of total shipments in 1981, McDonnell Douglas, 25.3 percent, and Lockheed, 7.4 percent.

Domestic shipments of medium and large transports, by quantity, accounted for 33.0 percent of total shipments in 1981, compared with 49.0 percent in 1977. The quantity of these shipments increased 134.2 percent during 1977-79, rising to 178 planes in 1979 (table 28). Shipments, in number, then decreased in each of the following 2 years, falling 15.2 percent in 1980 and 17.2 percent in 1981. The value of total domestic shipments increased annually during 1977-80, rising from $1.3 billion in 1977 to $3.0 billion in 1981. The Boeing Co. accounted for 56.0 percent of domestic shipments in 1981, McDonnell Douglas, 35.2 percent, and Lockheed, 8.8 percent.

Industry sources indicate that the decline in domestic aircraft shipments is due to the U.S. airlines' decreased earnings and lack of confidence in these airlines by financial backers. 1/ Investment in new aircraft by U.S. carriers is looked upon as risky because of the continuing threat to profitmaking by deregulatory price cutting and fare wars. 2/

Table 28.--Medium- and large-transport aircraft: U.S. producers' domestic shipments, by seating capacities, 1977-81

Item	1977	1978	1979	1980	1981
Medium-transport:					
61 to 80-----------seats----:	-	-	-	-	-
81 to 99-----------------do--:	10	8	20	11	40
99 to 120----------------do--:	6	18	33	21	18
Large-transport:					
Medium range:					
121 to 170------------do--:	52	87	93	80	51
171 to 220------------do--:	-	-	-	-	-
221 to 300------------do--:	6	13	16	26	15
Long range:					
121 to 170------------do--:	-	-	-	-	-
171 to 220------------do--:					
221 to 300------------do--:	-	-	-	-	-
301 to 400------------do--:	-	-	-	-	-
Over 400--------------do--:	2	2	16	13	1
Total industry:					
Aircraft----------Number----:	76	128	178	151	125
Value--(billion dollars)----:	$1.3	$1.6	$2.9	$3.0	$2.4

Source: Aerospace Industries Association, Aerospace Facts and Figures 1981/82.

1/ "Carriers Turn to Innovative Financing," Aviation Week and Space Technology, Nov. 8, 1982, pp. 46-49.

2/ "Airline Problems Enter Third Year," Aviation Week and Space Technology, Nov. 8, 1982, p. 40.

Investment expenditures.--Capital expenditures for all aircraft manufacturers (including military) amounted to $686.1 million in 1980, the last year such data are available. This represents a 13.6-percent increase over the $604.1 million spent in 1979, and a 239.3-percent gain over the 1977 figure. 1/

The aerospace industry performs approximately 20 percent of the value of all research and development performed in the United States. 2/ Research and development is an especially important area for aircraft manufacturers, because continued large expenditures are necessary to offer more improved, competitive products. Data for research and development expenditures in the medium- and large-transport industries are not separately available. However, research is currently being conducted on more fuel-efficient and quieter engines, on the use of composite materials in the airframe, and on improvements in avionics. Total research and development expenditures in the aerospace industry (including military) listed in table 29.

Table 29.--Aerospace industry: Total research and development expenditures, 1977-82

(In millions of dollars)

Year	Federal Government funds	Company funds	Total
1977	5,541	1,563	7,104
1978	5,811	1,879	7,690
1979	5,997	2,293	8,290
1980	6,896	2,730	9,626
1981	7,860	1,954	9,814
1982 1/	9,055	3,187	12,244

1/ Estimated.

Source: Aerospace Industries Association, Aerospace Facts and Figures 1982/83, p. 106.

1/ U.S. Department of Commerce, U.S. Industrial Outlook, 1983.
2/ Barry Bluestone, Peter Jordan, Mark Sullivan, Aircraft Industry Dynamics, Boston, 1981, p. 158.

American manufacturers assert that the research fallout from military programs is now minimal, and much of the Government research and development funding involves payback arrangements. Additionally, they contend that the research is not for the production of specific models of aircraft, but is general aeronautical research, the results of which become known throughout the world's aerospace community. 1/

Profitability.--Boeing is the largest U.S. manufacturer of commercial aircraft, with 1981 revenues in this area exceeding $7 billion. Profits for civil transport operations amounted to $308.1 million in 1981, representing a decrease of 354.7 percent from the 1980 figure of $677.6 million. 2/ McDonnell Douglas' revenues for commercial aircraft operations in 1981 totaled $2.4 billion. However, the firm lost $85 million in 1981 and 144.3 million in 1980 on its commercial airplanes. 3/ Profit data for Lockheed's commercial transport division are not available. However, company officials indicate that program losses on the only commercial transport currently produced by Lockheed, the L1011, totaled $2.5 billion by 1980. It is estimated that an additional loss of $467 million would be incurred in 1981.

The U.S. aircraft industry has been affected by the worldwide recession and the resulting postponing or cancellation of aircraft orders. Corporation officials indicate that increased foreign competition is also a reason for declining profits.

Employment.--The aircraft industry tends to be cyclical, and fluctuations in employment during a year are quite common. However, annual employment for aircraft manufacturers (including military) has steadily increased 33.4 percent during 1977-81. However, in January-June 1982, employment decreased 4.7 percent compared with that in the corresponding period of 1982 (table 30). Over the 5-year period, approximately 48 percent of the total number of workers employed in the manufacture of aircraft were production workers.

The number of persons actually employed by the three U.S. commercial transport manufacturers increased annually from 1977 to 1979, but has declined in recent years. Employment for the 5-year period increased to its highest level in 1979 at 100,000 workers, or by 78.9 percent over 1977 levels. The gain in employment reflects increased shipments during this period. Employment then decreased 1.5 percent in 1980 and 10.5 percent in 1981. In January-June 1982, the number of persons employed in the manufacture of medium and large transports declined 17.6 percent from the number in the corresponding period of 1981. The reduction in employment reflects decreased

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1/ Aerospace Industries Association, The Challenge of Foreign Competition to the U.S. Jet Transport Manufacturing Industry, December 1981, p. 67 and Memorandum from W. Stephen Piper, Office of the United States Trade Representative, May 18, 1982.

2/ The Boeing Company, May 1982, p. 21.

3/ Interavia, June 1982, p. 24.

aircraft orders due to the depressed financial condition of the world airline industry and increasing competition from abroad. 1/

Table 30.—Average number of employees in U.S. establishments producing all aircraft and medium- and large-transport aircraft, 1977-81, January-June 1981, and January-June 1982

(In thousands)

Item	1977	1978	1979	1980	1981	January-June 1981	January-June 1982
Average number of persons employed in the production of aircraft:							
All persons	270.4	288.3	333.2	354.1	360.6	348.2	331.7
Production and related workers	124.4	133.9	165.9	176.0	175.0	170.7	152.3
Average number of persons employed in production of medium- and large-transport aircraft:							
All persons	55.9	70.1	100.0	98.5	84.0	92.8	76.5

1/ Not available.

Source: Aerospace Industries Association.

Barriers to entry into the industry.--Enormous research and development and capital requirements provide a natural market entry barrier, making it almost impossible for new firms to join the industry. Additionally, industry sources indicate that it takes nearly 4 years to design and build an aircraft. The magnitude of the initial investment varies considerably, depending on a variety of factors. Principal among these are the size of the aircraft, initial sales acceptance and production rate, timing and extent of product improvements, inflation, individual program productivity, extent of risk assumed by subcontractors, debt versus equity financing used, purchase payment provisions, and delivery uncertainties. 2/

The pricing structure of the medium- and large-transport industries intensifies the initial capital risks. The cost of the first aircraft in a production series will greatly exceed what any airline could pay for it. The price, therefore, is initially based on the estimated cost of producing the

1/ Aerospace Facts and Figures 1981/82, Aerospace Industries Association, p. 130.

2/ Aerospace Industries Association, The Challenge of Foreign Competition to the U.S. Jet Transport Manufacturing Industry, December 1981, p. 31.

aircraft many years later. 1/ According to industry sources, it is not unusual to have to deliver 400 airplanes of the original model before breakeven is achieved; this often takes 10 to 12 years. 2/ The explanation for the pricing practice utilized by the aircraft industry lies in the principal known as "the learning curve," which states that labor costs decline steadily with the number of units produced, because workers learn as they work. Each manufacturer constructs its own learning curve when a program is undertaken in order to estimate the breakeven number of aircraft. The curve that develops usually dips steeply at first and then becomes more gradual. There is a general rule that with every doubling of the number of aircraft produced, a 25-percent reduction of direct labor cost is achieved. 3/

Derivatives of the initial model are normally required to maintain a continuous sales pace. With each derivative, however, comes added development cost, extending the cash flow deficit. 4/ The cost of developing a single airframe greatly exceeds the resources of an aircraft firm. Industry sources indicate that as much as $2 billion is required in preproduction commitments in design, tooling, marketing, and certifying a new aircraft. Therefore, when a producer introduces a new project, they are literally "betting the company" on that plane. Additionally, the U.S. civil aircraft industry faces the usual risks that are characteristic of any large capital good manufacturer: funding, future earnings, reputation, customer acceptance, and design obsolence. 5/

U.S. aircraft manufacturers have dominated the world markets since the introduction of the jet transport. However, their share of the world market is declining. During the 15 years before 1979, U.S. aircraft makers captured nearly 90 percent of the world market annually. Their 1981 share of the worldwide market was 69 percent. In the United States, domestic manufacturers have been more successful in retaining their market share.

During 1981, the world's airlines ordered 235 U.S.-built airplanes, compared with 360 orders in 1980. In January-June 1982, new orders totaled 67, only 7 of which were ordered by U.S. airlines. 6/ The ready availability on the current market of used medium- and large-transport aircraft is adversely affecting orders for new aircraft, which in turn, will affect future shipments. 7/ An estimated 9.5 percent of the current world airline fleet is

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1/ Robert Newhouse, "A Sporty Game, Betting the Company," The New Yorker, June 14,1982, p. 66.

2/ Aerospace Industries Association, The Challenge of Foreign Competition to the U.S. Jet Transport Manufacturing Industry, December 1981, p. 31.

3/ Ibid, p. 66.

4/ Ibid., p. 31.

5/ Ibid.

6/ Aerospace Industries Association," Historical and Current Data on Orders, Shipments, and Backlog of U.S. Civil Jet Transport Aircraft," Oct. 20, 1982.

7/ U.S. Department of Commerce, U.S. Industrial Outlook, 1983.

up for sale, according to recent estimates. 1/ Seat-mile costs of new aircraft are low in comparison with seat-mile costs to operate used aircraft. However, the breakeven load factor is higher for the new aircraft, partly because of high fixed costs that result from high interest rates and large initial costs. 2/ An overcapacity situation exists in the world's airlines, but few existing transports satisfy fuel consumption or noise compliance standards. Boeing's unit deliveries in 1982 are projected to drop 20 percent from those in 1981, and McDonnell Douglas and Lockheed deliveries are each expected to decline 30 percent. 3/

Major foreign competitors

There are three foreign manufacturers which currently market medium- and large-transport aircraft in the United States: Fokker B.V., British Aerospace, and Airbus Industrie. Each of the three manufacturers operates under a structure of both private and governmental ownership. Fokker B.V., of the Netherlands, currently manufactures the F-28, a medium-transport aircraft, developed in collaboration with MMB (West Germany), Short Brothers (Northern Ireland), and the Dutch Government. British Aerospace is owned equally by the British Government and private shareholders and also is involved in coproduction of aircraft with a U.S. company (Avco Aerostructures) and a Swedish company (Saab Scania). The firm is currently marketing the BAe 146, a medium-transport aircraft that will be delivered in 1983. In addition, British Aerospace is a partner in Airbus Industrie. Airbus Industrie is a consortium of European aircraft manufacturers backed by government loans. The company presently manufactures the A300, a medium-range large-transport aircraft. Additionally, Airbus Industrie is marketing another medium-range large-transport airplane, the A310. This aircraft will be available in 1983.

The worldwide market share of Airbus Industrie increased from 19 percent in 1980 to 26 percent in 1981. The combined share of Fokker B.V. and British Aerospace increased to 5 percent in 1981 from only 1 percent in 1980. 4/ An analysis of these three foreign companies is provided in appendix C.

Foreign Trade

Tariff and international agreements

Imports of medium and large transports are classified in TSUSA category 694.4165, "Civil Aircraft, Multi-Engine, over 33,000 pounds empty weight." The Agreement on Trade in Civil Aircraft is discussed on pages 14 and 15.

1/ "Quarterly Forecast: Aircraft," Iron Age, Oct. 4, 1982, p. 50.
2/ "Carriers Turn to Innovative Financing," Aviation Week and Space Technology, Nov. 8, 1982, p. 49.
3/ U.S. Department of Commerce, U.S. Industrial Outlook, 1983.
4/ Richard G. O'Lone, "Economy Key to Long-Term Outlook," Aviation Week and Space Technology, Mar. 8, 1982, p. 164.

U.S. imports

According to data received in response to industry questionnaires, imports of medium and large transports rose * * * percent in quantity during 1977-81, increasing from * * * planes in 1977 to * * * planes in 1981 (table 31). The value of imports increased * * * percent, rising from almost * * * million in 1977 to * * * million in 1981. There were only two categories in which these imports fell: * * *.

Foreign transport manufacturers have relatively small home markets and rely heavily on export sales. The United States, with 35 percent of the world's registered large transports, represents the single largest potential market. 1/ However, foreign manufacturers, to date, have had very limited success in this market.

U.S. exports

As they are with commuter aircraft manufacturers, export sales are very important to medium- and large-transport aircraft manufacturers. The economies of scale resulting from additional export sales can lower a firm's unit costs substantially. 2/ A recent analysis found that the price per unit of U.S. aircraft to U.S. airlines would be 40 percent greater without export sales. 3/ Exports of U.S.-manufactured medium and large transports increased 221.5 percent in quantity and 288.8 in value over those during 1977-81 (table 32).

1/ U.S. Department of Commerce, U.S. Industrial Outlook, 1982.
2/ The Labor Industry Coalition for International Trade, The Erosion of America's Competitive Edge, May 1982, p. 19.
3/ Aerospace Industries Association, The Challenge of Foreign Competition to the U.S. Jet Transport Manufacturing Industry, December 1981, p. 35.

Table 31.--Medium- and large-transport aircraft: U.S. imports, by seating capacities, 1977-81

Item	1977	1978	1979	1980	1981
	Quantity (units)				
Medium-transport:					
61 to 80---------------seats---	***	***	***	***	***
81 to 99----------------do----	***	***	***	***	***
100 to 120--------------do----	***	***	***	***	***
Large transports:					
Medium range:					
121 to 170------------do----	***	***	***	***	***
171 to 220------------do----	***	***	***	***	***
221 to 300------------do----	***	***	***	***	***
301 to 400------------do----	***	***	***	***	***
Long range:					
121 to 170------------do----	***	***	***	***	***
171 to 220------------do----	***	***	***	***	***
221 to 300------------do----	***	***	***	***	***
301 to 400------------do----	***	***	***	***	***
Over 400--------------do----	***	***	***	***	***
Total--------------------	***	***	***	***	***
	Value (1,000 dollars)				
Medium-transport:					
61 to 80---------------seats---	***	***	***	***	***
81 to 99----------------do----	***	***	***	***	***
100 to 120--------------do----	***	***	***	***	***
Large transport:					
Medium range:					
121 to 170------------do----	***	***	***	***	***
171 to 220------------do----					
221 to 300------------do----	***	***	***	***	***
301 to 400------------do----	***	***	***	***	***
Long range:					
121 to 170------------do----	***	***	***	***	***
171 to 220------------do----	***	***	***	***	***
221 to 300------------do----	***	***	***	***	***
301 to 400------------do----	***	***	***	***	***
Over 400--------------do----	***	***	***	***	***
Total--------------------	***	***	***	***	***

Source: Based on data received in response to questionnaires of the U.S. International Trade Commission.

Table 32.--Medium- and large-transport aircraft: U.S. exports, by seating capacities, 1977-81

Item	1977	1978	1979	1980	1981
Medium-transport:					
61 to 80----------seats----:	0	0	0	0	0
81 to 99---------------do--:	6	12	19	14	37
99 to 120--------------do--:	19	22	44	71	90
Large transport:					
Medium range:					
121 to 170-----------do--:	15	31	43	51	43
171 to 220-----------do--:	0	0	0	0	0
221 to 300-----------do--:	18	13	34	39	32
Long range:					
121 to 170-----------do--:	3	3	1	0	0
171 to 220-----------do--:	0	0	0	0	0
221 to 300-----------do--:	0	0	0	0	0
301 to 400-----------do--:					
Over 400-------------do--:	18	30	51	60	52
Total industry:					
Aircraft---------Number----:	79	111	192	235	254
Total value-----billion --------- -----dollars----:	$1.9	$2.6	$5.0	$6.9	$7.2

Source: Aerospace Industries Association, Aerospace Facts and Figures, 1982/83.

The commercial aircraft industry contributes a larger positive trade balance than any other U.S. industry except agriculture. During the last 10 years, the industry has produced a surplus of about $35 billion for the United States. 1/

The Current U.S. Market

Description of U.S. market

Major and large regional airlines are the purchasers of medium and large transports. U.S. airlines, in both domestic and international operations, carried 286 million passengers on more than 5 million flights in 1981. Airline industry revenues in 1981 reached an alltime high of $36 billion, but operating losses were $421 million. The previous year's losses totaled $222 million. The financial losses in 1981 were caused by decreased ridership due to the U.S. recession coupled with inflation cost, high cost of borrowing, and the impact of the air traffic controllers strike. Airline analysts also

1/ Lad Kuzela, "Battle of the Aircraft Giants," Industry Week, Dec. 14, 1981, p. 78.

recognized that price wars in the airline industry contributed significantly to unsatisfactory earnings. 1/

The airlines of the world are currently operating over 5,000 commercial jet transports, and the world fleet has an average age of over 9 years. 2/ The United States is estimated to operate approximately 45 percent of this total. There are over 300 airlines in the world, 25 of which account for more than 60 percent of the world's traffic. Ten of these top 25 airlines are U.S. carriers. Because of the concentration among the relatively small number of carriers, the degree of success achieved by aircraft producers depends largely on the level of sales to these carriers. 3/ However, initial sales of aircraft to each single customer are also critical. The outcome of the initial sales competition for a market model will have long-term effects upon the entire industry. Due to a number of reasons, primarily the desire for commonality in equipment, the loss of initial sales opportunities will most likely result in the loss of that carrier's market for 15 to 20 years (for that size plane). Additionally, follow on spare parts sales are lost, and these items always exceed the value of the initial order. The average follow-on sale is nearly three times the first order over the life of the program. 4/

Under the Airline Deregulation Act of 1978, the view of mass air transit as a public utility requiring Government regulation was renounced in favor of free-market economics. The reasoning was that a more competitive environment in the airlines would lower fares and improve service. 5/ The deregulation allowed U.S. carriers the opportunity to freely enter new markets or exit from those which were no longer profitable. The deregulation of the airline industry helped equipment manufacturers in 1979 and 1980. Open price competition and fare wars soon after deregulation increased the demand for airline seats, ultimately creating a demand for aircraft. 6/

The early 1980's represent the third reequipment cycle for U.S. airlines. Beginning with the first equipment cycle, which commenced with the advent of the commercial jet transport in the late 1950's, each generation embodied new technology responsive to economic pressures. The first was a response to the demand for long-distance, fast and comfortable transportation. The second generation, which encompassed the development and sale of the wide-bodied "jumbo jets" (mid-1960's), emerged as a response to the growth in demand for passenger-mile capacity and overcrowded airlines. Environmental

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1/ Air Transport Association, Air Transport 1982, June 1982.

2/ Aerospace Industries Association, The Challenge of Foreign Competition to the U.S. Jet Transport Manufacturing Industry, December 1981, p. 22.

3/ The Boeing Co., The Economics of the Civil Aircraft Industry, September 1981, p. 3.

4/ Air Transport Association, op. cit.

5/ Robert Newhouse, "A Sporty Game, Betting the Company, The New Yorker, June 14, 1982, p. 58.

6/ Ibid., p. 59.

pressures and the increased cost of fuel are responsible for the development of the latest generation of commercial transports. 1/

The major U.S. airlines have a very sophisticated purchase decision process utilizing specialists employed to evaluate equipment decisions. This process makes selling aircraft to U.S. carriers a complicated and lengthy task. The initial sale often involves multiple aircraft, with options for future purchases provided. Industry sources indicate that the sales process itself typically takes from 6 months to 1 year to complete, if the carrier has actually decided to buy new equipment.

The U.S. airlines are assisted in purchasing their aircraft under the FAA Guaranteed Loan Program. Under this program, which continues through 1983, air carriers are eligible for Federal guarantees on their commercial loans, up to $100 million per carrier, for the purchase of new or used equipment. Since the 1978 airline deregulation, * * * aircraft, * * * of which were foreign-made medium transports, have been guaranteed by this program. 2/

Factors influencing market demand

According to data received from U.S. airlines, increased passenger traffic and route expansion were cited as the two primary factors influencing market demand; other factors noted were efficiency and passenger comfort. Additionally, the need to comply with FAA and International Civil Aviation Organization Noise Regulations, which are due to come into effect in late 1985 and early 1986, respectively, were also cited.

Large airline losses and high interest rates have negatively influenced new-equipment decisions significantly. Additionally, the unstable economic environment has caused numerous U.S. carriers to delay, or even cancel, new-equipment deliveries and orders. From July 1, 1981, to Sept. 30, 1982, approximately $2.8 billion in aircraft orders by U.S. airlines were canceled. Also, U.S. carriers were unable to take delivery of $450 million in new aircraft due to the adverse financial conditions in the industry. According to airline industry officials, if interest rates continue to decline, reducing the fixed costs of operating new generation aircraft, airline demand for new equipment could increase. 3/

Apparent U.S. consumption

Apparent U.S. consumption of medium- and large-transport aircraft increased from * * * planes in 1977 to * * * planes in 1979, or by * * * percent. Consumption, by quantity, then decreased by less than * * * percent

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1/ Barry Bluestone, Peter Jordan, Mark Sullivan, Aircraft Industry Dynamics, Boston, 1981, p. 47.
2/ * * *.
3/ "Carriers Turn to Innovative Financing," Aviation Week and Space Technology, Nov. 8, 1982, p. 46.

in 1980. In 1981, the quantity of apparent consumption increased * * * percent, rising to * * * aircraft. The value of apparent U.S. consumption increased from * * * billion in 1977 to * * * billion in 1981, or by * * * percent. The ratio of imports to apparent consumption, by quantity, fluctuated over the 5-year period, but totaled * * * percent in both 1977 and 1981. In value terms, the ratio rose from * * * percent in 1977 to * * * percent in 1981, as shown in table 33.

Table 33.--Medium- and large-transport aircraft: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent U.S. consumption, 1977-81

(Quantity in units; value in thousands of dollars)

Year	Producers' shipments	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
	Quantity				
1977	155	***	54	***	***
1978	239	***	77	***	***
1979	370	***	129	***	***
1980	386	***	150	***	***
1981	379	***	127	***	***
	Value				
1977	3,197,000	***	1,857,000	***	***
1978	4,225,000	***	2,638,000	***	***
1979	8,048,000	***	5,099,000	***	***
1980	9,916,000	***	6,868,000	***	***
1981	9,652,000	***	7,220,000	***	***

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission and Aerospace Industries Association, Aerospace Facts and Figures, 1982/83.

Foreign aircraft represent a small percentage of medium- and large-transport aircraft currently in use in the United States. Virtually all of those planes used by major and large regional airlines were domestically produced.

There is only one U.S. airline, * * *, which operates foreign-made large-transport aircraft. This carrier has a total of * * * in operation, and has an additional * * * on order. * * *. 1/ An analysis of the sale to Eastern Airlines is included in appendix G. There were 148 British Aerospace

1/ * * *.

BAe-111's in operation in the United States in 1981. 1/ There are no BAe-146 aircraft currently in operation in the United States; the BAe-146 will not be delivered until 1983. However, British Aerospace had firm orders for 11 BAe-146 aircraft and options to purchase an additional 12 at the end of 1981. The number of these aircraft to be delivered to U.S. airlines is not available. 2/ Data regarding the number of Fokker F-28's in operation in the United States are not available, however, there were a total of 189 aircraft operated in 32 countries in 1981. 3/

Foreign Export Credit Subsidies and their Impact on the U.S. Industry

The types of credit programs provided by most countries to encourage the export of medium- and large-transport aircraft are the same as those used to finance all exports. Details regarding official export credit programs can be found in the section entitled "Export Credit Subsidies."

The financing of medium- and large-transport aircraft

Medium and large transports are primarily financed through bank loans, but the importance of leasing in this market is growing. Foreign export credits have not been used by U.S. purchasers of these aircraft from 1979 to 1982. Such credits were used by two domestic airlines in 1977 and 1978.

The future significance of export credits in this market will depend on the behavior of U.S. interest rates and on the policies of foreign governments. Foreign export credits with interest rates below market levels could be very important in the competition between different aircraft. These credits could reduce the cost of owning and operating a foreign aircraft below the cost of owning and operating a U.S. aircraft even if the U.S. aircraft were lower priced and more fuel efficient.

Sources of financing.--The leading source of financing has been bank loans, as shown in table 34. Leasing, however, has greatly increased in importance since 1978. Leasing has grown in importance because interest rates on bank loans have increased dramatically and because the airline industry's poor profits and the increased uncertainty due to deregulation have made banks reluctant to finance aircraft purchases. 4/ The safe-harbor leasing provision

1/ Air Transport Association, Air Transport 1982, June 1982.
2/ "Jet Airliner Order and Delivery Record," Interavia, March 1982, p. 212.
3/ Sam L. Jones, "Fokker Eyes U.S. Market Gives F-28 Jet Capability," American Metal Market, Sept. 13, 1982, p. 29.
4/ "Carriers Turn to Innovative Financing," Aviation Week and Space Technology, Nov. 8, 1982, pp. 46 and 49.

Table 34.--Medium- and large-transport aircraft: Sources of financing and number of purchasers identifying each source, 1977-81 1/

Source	1977	1978	1979	1980	1981
Banks	10	9	10	11	10
Sellers	2	0	1	1	2
Insurance companies	2	2	6	4	3
Leasing 2/	2	1	5	4	9
Other	0	2	3	5	3

1/ Some purchasers identified more than 1 source of financing in each year.
2/ Includes lease-purchase agreements.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

of the Economic Recovery Tax Act of 1981 has made leasing more attractive. This provision expires at the end of 1983.

Purchasers of medium and large transports usually do not use loan guarantees. The only loan guarantees reported in response to the Commission's questionnaire were from the U.S. Government, usually the Federal Aviation Administration. 1/

Credit terms available on domestic aircraft.--The interest rate paid on bank loans to purchase medium and large transports is usually just above the prime rate, the rate banks charged their most creditworthy borrowers. From 1977 to 1981, the prime rate rose substantially and became increasingly volatile. 2/ In recent months, however, the prime rate has been declining. The prime rate was 13 percent on September 30, 1982.

Because of the depressed demand for aircraft, one domestic producer, McDonnell Douglas, has begun offering short-term leases on aircraft at very favorable terms. McDonnell-Douglas recently leased 20 DC-9-80's to American Airlines for 5 years at an implicit interest rate of 6 percent. 3/

Foreign export credits.--U.S. airlines have only received foreign export credits in two cases, both prior to 1979. The future importance of export credit sales in the U.S. aircraft market will depend on the policies of

1/ The FAA loan guarantee program will expire on Oct. 24, 1983. This program received no funding for fiscal year 1983, which began on Oct. 1, 1982. However, $50 million of funding for fiscal year 1982 is still available for use in 1983. Letter of Edward W. Simpson to Kenneth R. Mason, Oct. 6, 1982.
2/ See table 16 in the commuter aircraft section.
3/ Op. cit., "Carriers Turn to Innovative Financing," p. 46.

foreign aircraft exporters and the behavior of U.S. interest rates. If foreign aircraft manufacturers can offer interest rates below market rates, they may gain a significant advantage when competing with domestic manufacturers.

One instance of a foreign export credit on a sale of a large transport involves Eastern Airlines' purchase of 23 Airbus A-300's. Eastern Airlines received extremely favorable terms on these aircraft. This case is fully discussed in appendix G. The second instance involves the sale of a U.S. aircraft. The United Kingdom's official export credit agency financed Pan American Airlines' purchase of 12 Lockheed L-1011's, because the engines on these aircraft were made by Rolls-Royce.

Foreign export credits on medium and large transports are subject to two international agreements. The OECD Standstill Agreement on aircraft restricts the financing of these aircraft to 90 percent of their value and a term of no more than 10 years. 1/ The interest rate is to be no more favorable than that offered in 1975. The second agreement is between the United States and the Airbus Consortium. This agreement, titled the Common Line, became effective on August 1, 1981, and limits financing to 62.5 percent of value for a term of no more than 10 years at an interest rate on dollar loans of no less than 12 percent. 2/ This agreement does not apply to aircraft sales to purchasers in the United States or in the three countries of the Airbus Consortium: France, West Germany and the United Kingdom.

The savings that result to aircraft purchasers from the favorable financing under the terms of these agreements can be shown using present-value analysis. The results are in table 35. Because the Standstill Agreement does not specify minimum interest rates, the 12-percent interest rate specified in

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1/ The Standstill Agreement allows leases with terms of up to 12 years. It does not allow export credit agencies to finance any part of the aircraft's value that is provided by suppliers in the importing country. In providing financing for the L-1011's to Pan American, the United Kingdom violated the Agreement by allowing a 15-year repayment term by financing 100 percent of the value of the engines and by financing part of the value of the U.S.-produced airframes. See Statement of J. L. Moore, President and Chairman of the Export-Import Bank of the United States, Before the U.S. Congress House Committee on Ways and means, July 14, 1978, pp. 67 and 68. The terms of financing of Eastern Airlines' purchase of the Airbus also went beyond the terms allowed in the Agreement. See Statement of Gary C. Hufbauer, Deputy Assistant Secretary of the Treasury, Ibid. pp. 71 and 72.

2/ Duff, op. cit., pp. 921-923. The Common Line agreement allows financing of 62.5 percent of value if the credit is repaid over the full 10 years of the contract and financing of 42.5 percent of value if the credit is repaid only in the last 5 years of the contract. The minimum interest rate on loans of French francs is 11.5 percent. The minimum interest rate on loans of German deutsche marks is adjusted as the relationship between the West German and U.S. bond interest rates changes. Most loans to purchase foreign aircraft are denominated in dollars.

the Common Line agreement was assumed throughout this example. 1/ The Standstill Agreement, however, would allow a much lower interest rate. Financing under the Common Line agreement is less attractive than financing under the Standstill Agreement. At a 14-percent market rate of interest, Standstill Agreement financing reduces cost by 6.0 percent; the Common Line agreement financing reduces cost by 4.0 percent. An increase in market interest rates would make financing under either agreement substantially more attractive. At a 16- percent market rate of interest, Standstill Agreement financing reduces cost by 11.5 percent, and the Common Line agreement financing reduces cost by 8.0 percent.

U.S. medium- and large-transport aircraft industry perspective

According to the domestic manufacturing industry, aircraft financing is playing an increasingly important role in determining the success of a sale in the U.S. market or in foreign markets.

U.S. market.--Due to increases in the prime rate and greater debt incurred by expanding airlines, the interest burden for U.S. carriers has grown significantly, rising from $300 million in 1977 to an estimated $1.3 billion in 1982. 2/ Questionnaire responses from purchasers indicate that, in a typical distribution of operating costs over the life of an aircraft purchased in 1981, interest costs account for an average of 12.0 percent, price, 12.3 percent, and fuel 45.2 percent. Other factors, such as insurance, labor and maintenance costs, account for approximately 30.5 percent. These cost components for individual aircraft types, purchased in 1981, are shown in the following tabulation:

Item	Interest	Price	Fuel	Other
Medium-transport airplane-------------------	11.6	14.2	46.9	27.3
Medium-range large-transport airplane-----------	12.3	12.1	44.7	30.9
Long-range large-transport airplane----------------	12.0	10.5	44.0	33.5
Average---------------	12.0	12.3	45.2	30.5

1/ Both contracts used in this example call for 20 equal semiannual payments of principle, with interest payments determined by the outstanding balance. Downpayments are made at delivery, and the first payment is made 6 months later. Each contract is for the purchase of a $20 million dollar aircraft, the approximate value of the Airbus A-300's Eastern Airlines purchased in 1978.

2/ "Interest Rate Drop Eases Carrier Payments," Aviation Week and Space Technology, Oct. 25, 1982, p. 31.

Table 35.--Medium- and large-transport aircraft: Effects of financing on the cost of purchasing transports, by assumed interest rates

Terms	Assumed market interest rate								
	14 percent			15 percent			16 percent		
	Present value	Savings		Present value	Savings		Present value	Savings	
	-Million dollars-		Percent	Million dollars-		Percent	-Million dollars-		Percent
Standstill	18.8	1.2	6.0	18.2	1.8	9.0	17.7	2.3	11.5
Common Line	19.2	.8	4.0	18.8	1.2	6.0	18.4	1.6	8.0

Source: Estimated by the staff of the U.S. International Trade Commission.

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Decreases in any of the above-mentioned factors can make a significant difference in total operating costs for an airline. According to industry sources, a change of 1 percentage point in the average interest rate charged U.S. airlines is equivalent to a difference of $30 million in annual interest payments. 1/ Because of the importance of interest costs, U.S. manufacturers of medium- and large-transport aircraft assert that the difference in a few percentage points can offset decreases in price or increases in fuel efficiency. Figure 3 illustrates the relationship between price and interest rates using financing of 90 percent of the value of the aircraft, as specified in the Standstill Agreement, and financing of 62.5 percent of the value of the aircraft, as provided for under the Common Line Agreement. 2/ Figure 3 shows that if a foreign manufacturer offered financing at an interest rate 1 percentage point below the interest rate available on a U.S. aircraft, financing 90 percent of the value of the aircraft, that would offset a 3-percent price advantage. If the foreign producer financed only 62.5 percent of the value of the aircraft, a 1 percentage point advantage would offset a 2-percent price advantage. The relationship between fuel efficiency and interest rate advantages is shown in figure 4. A 1 percentage point interest rate advantage would offset the cost savings achieved by a 2-percent increase in fuel efficiency, using financing of 90 percent of the value of the aircraft. If financing of only 62.5 percent of the value of the aircraft were used, a 1 percentage point interest rate advantage would offset a 1-percent advantage in fuel efficiency.

Export markets.--Domestic manufacturers indicate that they have lost numerous sales of medium- and large-transport aircraft in traditional U.S. export markets because of the existance of foreign export credit subsidies. Although specific data on these lost sales are not available, industry sources indicate that a significant portion of the decline in the U.S. industry's world market share is due to below-market financing. Additional factors noted by domestic producers include lower price due to production subsidies and political leverage by foreign producers' respective governments.

1/ "Interest Rate Drop Eases Carrier Payments," Aviation Week and Space Technology, Oct. 25, 1982, p. 31.

2/ The method of constructing figs. 3 and 4 is described in app. D.

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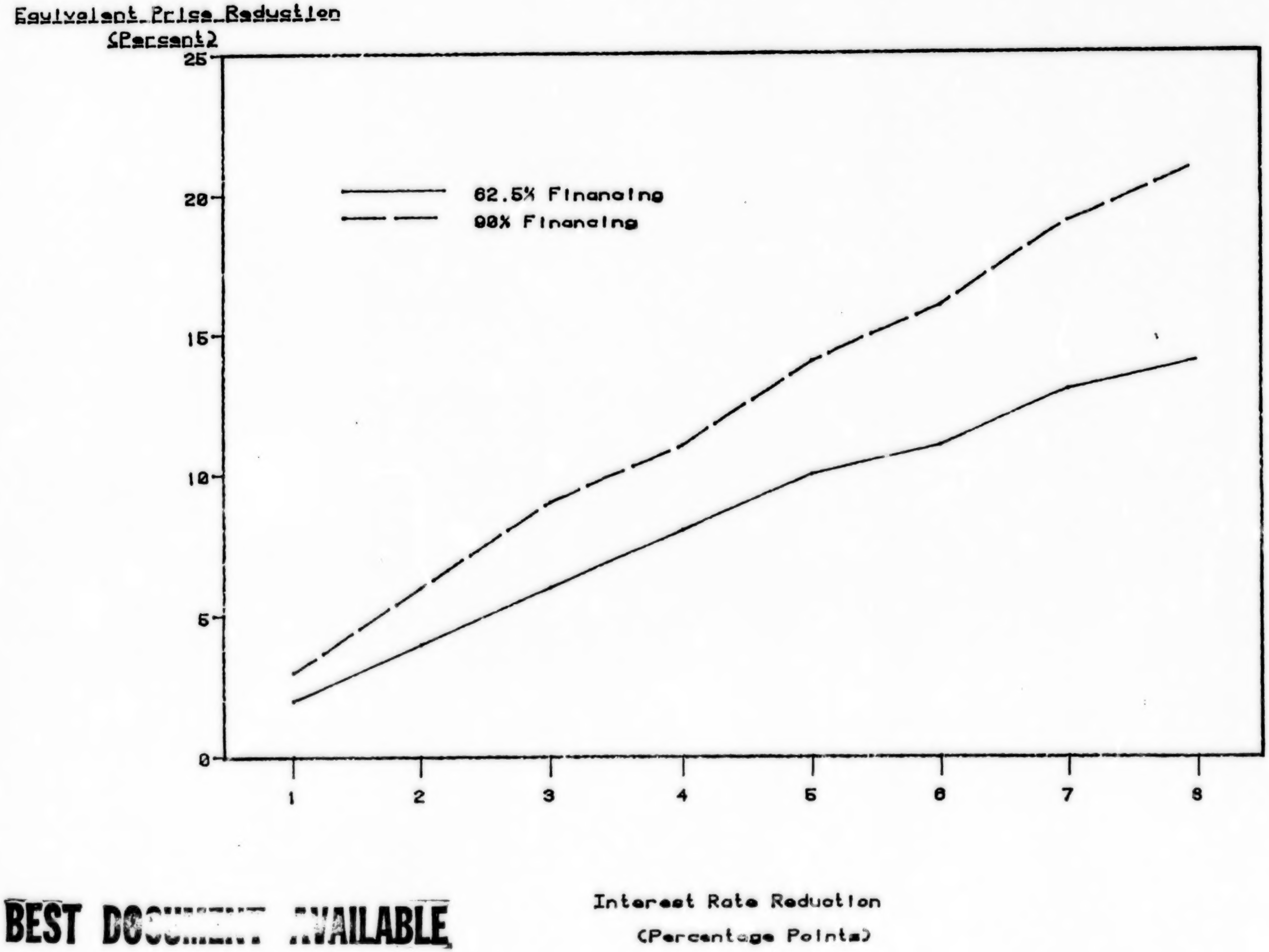
Figure 3.--Medium- and large-transport aircraft: Relationship between interest rates and pricing advantages.



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

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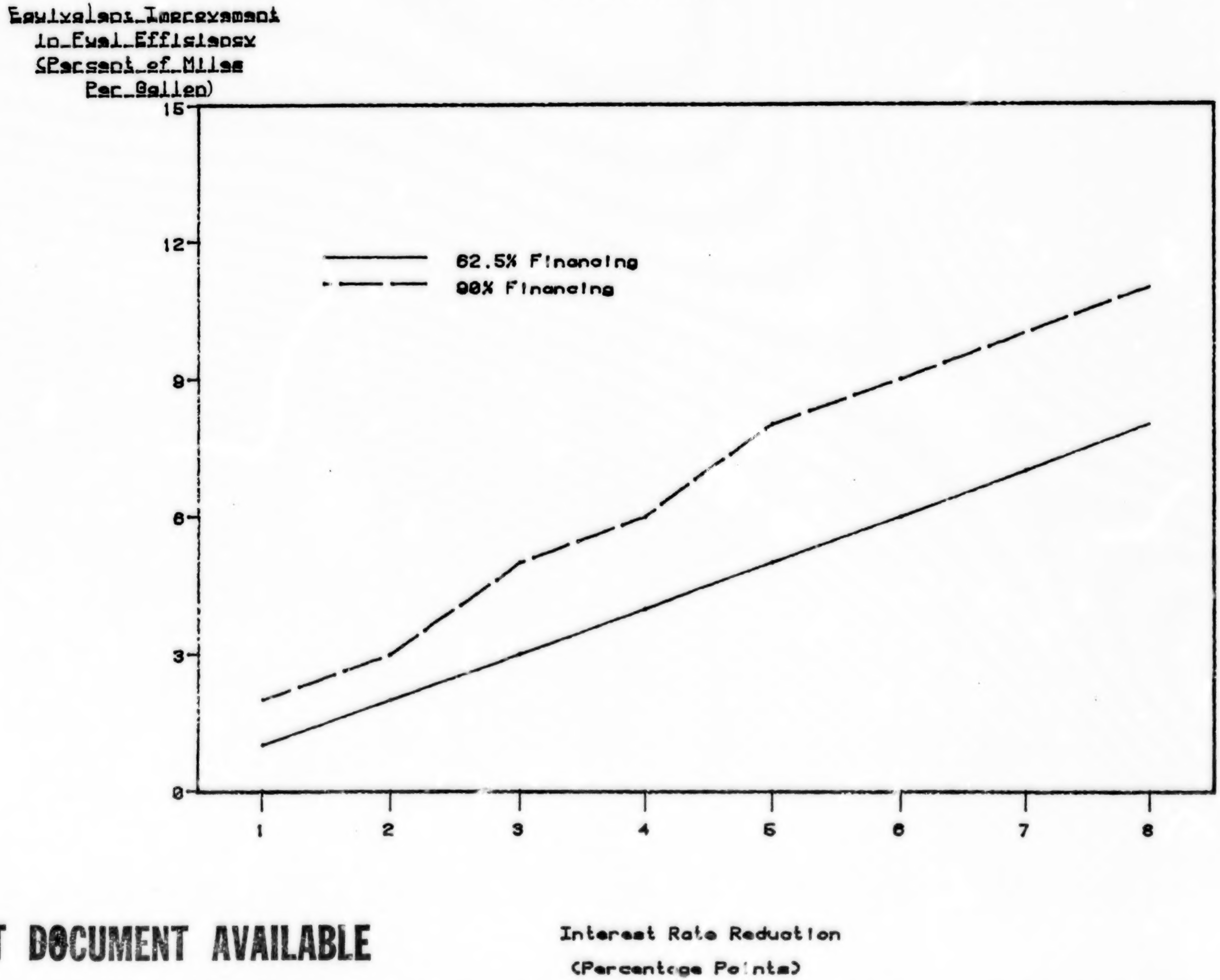
Figure 4.--Medium- and large-transport aircraft: Relationship between interest rate advantages and fuel efficiency.



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. airline industry perspective

Although below-market financing can reduce the cost of purchasing medium- or large-transport aircraft for U.S. airlines, other criteria are considered more important to those operators in deciding on an aircraft to purchase. In the Commission's questionnaires, purchasers were asked to rank the criteria used in making their aircraft-purchasing decision. Those criteria, and the results of the airline operator's responses, are shown in table 36. The financial package offered by producers ranked as the eighth most important criteria considered when purchasing a medium- or large-transport aircraft. Most important, in descending order, are fuel efficiency, passenger capacity, price, range, and availability.

Table 36.--Weighted ranking of selected criteria in the purchasing of medium- and large-transport aircraft

Ranking 1/	Criteria	Number of purchasers selecting criteria		
		Most important	2d most important	3d most important
1	Fuel efficiency	6	3	3
2	Passenger capacity	5	3	0
3	Price	2	3	4
4	Range	3	2	1
5	Availability	3	0	0
6	Technology	1	1	1
7	Quality	3	0	0
8	Financial package and service	2	1	1
9	Technical support	1	1	1
10	Engine characteristics	1	1	1
11	Reputation	1	1	0
12	Fleet standardization	1	0	0

1/ Overall ranking, based on the questionnaire responses of U.S. airline companies.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Likely Future Trends in the U.S. Market

U.S. civil aircraft manufacturers are uncertain about the near future. Due to the economic downturn in the United States, plus increased fuel prices, traffic declined and competition increased due to deregulation, the airlines are currently losing money, and new orders for commercial airplanes are declining. 1/ However, U.S. manufacturers of commercial transports still

1/ Aerospace Industry Association, The Challenge of Foreign Competition to the U.S. Jet Transport Manufacturing Industry, December 1981, p. 65.

believe there is a lucrative long-term market. FAA officials estimate that total medium and large jet aircraft operated in the United States will increase to 2,835 planes in 1990, from the current level of 2,481 planes. The breakdown, of aircraft by types, is listed in table 37.

Table 37.--Medium- and large-transport aircraft: Actual and projected number of aircraft in service in the United States, 1977-90

Item	Total	Narrow body			Wide body		
		2-engine	3-engine	4-engine	2-engine	3-engine	4-engine
Historical:							
1977-------	2,139	535	820	477	-	202	105
1978-------	2,168	553	865	436	2	204	108
1979-------	2,237	576	931	394	6	215	115
1980-------	2,394	615	1,029	380	12	227	131
1981-------	2,481	663	1,097	297	25	255	144
Forecast:							
1982-------	2,541	728	1,109	252	26	273	153
1983-------	2,665	774	1,146	250	60	280	155
1984-------	2,697	788	1,123	229	116	283	158
1985-------	2,713	826	1,077	201	160	283	166
1986-------	2,721	866	1,037	159	198	288	173
1987-------	2,710	881	983	138	228	291	189
1988-------	2,735	916	931	114	273	293	208
1989-------	2,774	982	884	92	309	295	212
1990-------	2,835	1,051	828	1	360	292	223

Source: U.S. Department of Transportation, Federal Aviation Administration, FAA Aviation Forecast, February 1982.

The possible future world market for medium and large transports over the next 10 years is estimated by Boeing at $126 billion. 1/ * * *. 2/ Lengthening the forecast period to 1993, Airbus Industries estimates an open world market of $115.8 billion. 3/

1/ Richard G. O'Lone, "Economy Key to Long-Term Growth," Aviation Week and Space Technology, Mar. 8, 1982, p. 162.

2/ * * * .

3/ Robert Newhouse, "A Sporty Game, Betting the Company," The New Yorker, June 14, 1982, p. 53.

Information obtained from industry questionnaires responses indicates that most airlines anticipate purchasing medium transport aircraft with 100- to 120-passenger capacity, and medium-range large-transport aircraft with 121- to 170-passenger capacity (table 38).

Table 38.--Medium- and large-transport aircraft: U.S. airlines' future contract awards, by seating capacities, 1982-86

Item	1982	1983	1984	1985	1986
Medium transports:					
61 to 80--------------------seats--:	***	***	***	***	***
81 to 99--------------------do----:	***	***	***	***	***
100 to 120------------------do----:	***	***	***	***	***
Large transports:					
Medium range:					
121 to 170-----------------do----:	***	***	***	***	***
171 to 220-----------------do----:	***	***	***	***	***
221 to 300-----------------do----:	***	***	***	***	***
301 to 400-----------------do----:	***	***	***	***	***
Long range:					
121 to 170-----------------do----:	***	***	***	***	***
171 to 220-----------------do----:	***	***	***	***	***
221 to 300-----------------do----:	***	***	***	***	***
301 to 400-----------------do----:	***	***	***	***	***
Over 400-------------------do----:	***	***	***	***	***
Total-------------------------:	***	***	***	***	***

As stated earlier in this report, the worldwide market shares of U.S. aircraft manufacturers is declining. Although the share of the U.S. market held by the three domestic producers is well above 90 percent, foreign competition in the United States is increasing. Airbus Industrie, in particular, has become a viable contender. The firm currently produces two wide-bodied large-transport aircraft. However, preliminary design work has begun on a standard-body 150-seat aircraft. If this airplane is produced, Airbus Industrie, like Boeing, will have a "family" of planes to offer its customers, and thus increase each plane's marketability. Industry sources indicate that Boeing, the world's most successful aircraft manufacturer, gained an important competitive advantage by offering a large and growing assortment of planes. The airlines increasingly require variety in their fleets, i.e., airplanes of varying sizes and ranges, for use on routes of differing distance and passenger density. 1/ Since fleet commonality is an

1/ Richard G. O'Lone, "Economy Key to Long-Term Growth," Aviation Week and Space Technology, Mar. 8, 1982, p. 162.

important consideration in new-equipment decisions, Airbus Industrie has increased its chances of penetrating the U.S. market. If this import penetration occurs, it as assumed that such penetration will displace U.S. production of aircraft. The impact on U.S. employment and output of such production not undertaken by U.S. firms is shown on page 43.

HELICOPTERS

The Structure of the U.S. Industry and That of Major Foreign Competitors

Product description

A helicopter is rotary-wing aircraft which depends principally for its support and motion in the air upon the lift generated by one or more power-driven rotors, rotating on substantially vertical axis. Helicopters are broadly classified into four main groups according to their gross weight. The light class covers aircraft up to 6,000 pounds gross weight, the intermediate class covers aircraft of between 6,000 and 14,000 pounds, the medium class covers aircraft between 14,000 and 25,000 pounds, and the heavy class covers aircraft greater than 25,000 pounds. Currently, there are 82 different civil helicopter models in operation, 34 in production, and 7 civil prototypes. Civil models can operate at speeds from hover to more than 170 knots and over ranges of up to 620 nautical miles. Until recently, U.S. commercial helicopters larger than the three-passenger size have been derivatives of military helicopters. However, new models are now being developed which are specifically tailored to commercial use. 1/ A helicopter has a useful life of 7 to 10 years. 2/ A listing of helicopter models in service, along with information about each model, is provided in appendix A.

U.S. industry

There are eight producers of civil helicopters in the United States: Bell, Hughes, Sikorsky Boeing Vertol, Bryantly-Hynes, Enstrom, Robinson, and Hiller. However, Bryantly-Hynes has not delivered any civil helicopters since 1979. These manufacturers produce a variety of helicopter models in all four weight classes, ranging in seating capacity from 2 to 47 passengers, with a useful load capacity of up to 30,000 pounds. Additionally, all of these manufacturers produce military as well as civil helicopters. Production facilities are located in Texas, California, Connecticut, Oklahoma, Michigan, and Pennsylvania. Industry sources indicate that the first four firms mentioned constitute over 50 percent of total U.S. production.

The U.S. share of the world market has declined over the past 10 years. During the 5-year period from 1970 to 1974, U.S. companies' share of the sales value of all helicopters produced in the free world was 68 percent. 3/

1/ William Yates, Bell Helicopter Textron, National Aeronautics and Space Administation, Assessment of Historical and Projected Segments of U.S. and World Civil and Military Rotorcraft Markets 1960-1990, 1980, p. 152.

2/ NASA's Role in Aeronautics: A Workshop, Volume V Rotorcraft, National Academy Press, 1981, p. 7.

3/ Helicopter News, May 11, 1981, p. 77.

In 1981, the U.S. share was 60 percent. According to trade association figures, this share could drop to 20 percent by 1999 because of increased foreign competition. 1/ Detailed information on individual U.S. producers is included in appendix B.

U.S. shipments.--U.S. civil helicopter shipments increased annually from 848 units in 1977 to 1,366 units in 1980, or by 61.1 percent (table 39). The value of shipments increased 161.4 percent over the same period. Shipments decreased 21.5 percent in quantity and 9.0 percent in value in 1981. These decreases reflect the sluggish economy, declines in markets for helicopter operators serving the energy industry, and high interest rates. Deliveries of larger, higher value helicopters account for the relatively small decline in billings, in light of the sharp declines in delivery. These larger helicopters were used in oil exploration and operations. The unit value of total shipments increased annually during the five-year period, rising from \$296,000 in 1977 to \$556,900 in 1981. In January-June 1982, shipments totaled 323 units, valued at \$206,000. Data for January-June 1981 are not available.

Table 39.--Civil helicopters: U.S. producers' total shipments, 1977-81, January-June 1981, and January-June 1982

Year	Quantity	Value	Unit value
	Units	1,000 dollars	1,000 dollars
1977	848	251,000	296.0
1978	904	328,000	362.8
1979	1,019	403,000	395.5
1980	1,366	656,000	480.2
1981	1,072	597,000	556.9
January-June--			
1981	1/	1/	1/
1982	323	206,000	637.8

1/ Not available.

Source: Aerospace Industries Association, Aerospace Facts and Figures 1982/83, p. 34.

1/ NASA's Role in Aeronautics: A Workshop, Volume V: Rotorcraft, National Academy Press, 1981, p. 7.

<u>Investment expenditures</u>.--Data are not available for U.S. producers' capital expenditure in the civil helicopter industry. In the area of research and development, U.S. industry sources indicate that increased research and development expenditures are necessary to maintain international helicopter competitiveness. It has been estimated that an investment of at least $250 million is required to develop a small, light helicopter. The expenditure necessary for development of larger models is substantially more. 1/ Research is currently being undertaken in the areas of advanced composites and related manufacturing processes to improve technology and yield weight savings. Additionally, current investment in engine development is aimed at improving fuel consumption, reliability, maintenance, payload, and noise. Data on total research and development expenditures for civil helicopters are not separately available. Total helicopter research and development expenditures (including military) are listed in table 40.

Table 40.--Civil helicopters: U.S. industry research and development expenditures, 1977-81

(In millions of dollars)

Year	By companies	By Federal Government	Total
1977	1,563	5,541	7,104
1978	1,879	5,811	7,690
1979	2,293	5,497	8,290
1980	2,730	6,896	9,626
1981	1,954	7,860	9,814

Source: Aerospace Industries Association, <u>Aerospace Facts and Figures 1981/82</u>.

Government support of the helicopter industry has always been a major factor in its growth, both in the United States and abroad. 2/ U.S. Government research and development expenditures for civil helicopters increased from $11.0 million in 1977 to an estimated $52.4 million in 1981, or by 376.4 percent. U.S. Government funds invested for civil helicopter research and development through National Aeronautics and Space Administration programs are listed in the following tabulation:

1/ "Helicopters," <u>Financial Times</u>, Feb. 26, 1982, p. 27.
2/ William Yakes, Bell Helicopter Textron, <u>Assessment of Historical and Porjected Segments of U.S. and World Civil and Military Rotorcraft Markets, 1960-1990</u>, National Aeronautics and Space Administration, 1980, p. 152.

Year	U.S. Government research and development (million dollars)
1977	11.0
1978	14.8
1979	18.6
1980	1/ 40.7
1981	1/ 52.4
1982	1/ 66.1

1/ Estimated.

Source: William Yates, Bell Helicopter Textron, National Aeronautics and Space Administration, Assessment of Historical and Projected Segments of U.S. and World Civil and Military Rotorcraft Markets, 1960-1990, 1980.

Currently, NASA and the military services jointly sponsor three major programs involving helicopters with both civil and military potential. 1/ However, although the majority of funding for helicopter development comes from a variety of Government sources, the growing emphasis on civil helicopter development is demanding substantially increased investment from U.S. producers. 2/

Industry sources indicate that since demand is currently concentrated in the light and intermediate classes of helicopters, most investment is currently being made in this area. According to helicopter producers, until the demand for larger models of helicopters expands, research and development in this area is likely to be concentrated in modifying large military helicopters for use in the civil market. 3/

Employment.--Employment among U.S. helicopter producers increased annually during 1977-80, gaining 33.6 percent (table 41). However, due to decreased production, employment declined 6.0 percent in 1981. In January-June 1982, employment totaled 27,200 workers. The number of scientists and engineers employed by helicopter producers fluctuated over the 5-year period, decreasing to 3,000 in 1981 from the 1977 level of 3,700. During January-June 1982, there were 3,200 scientists and engineers employed by U.S. helicopter manufacturers. Data on the number of production workers employed by helicopter manufacturers are not available.

1/ Aerospace Industries Association, Aerospace Facts and Figures, 1981-82, p. 91.

2/ "Helicopters," Financial Times, Feb. 26, 1981, p. 27.

3/ Ibid.

Table 41.--Average number of employees in U.S. establishments producing civil helicopters and all related scientists and engineers directly engaged in the production of helicopters, 1977-81 and January-June 1982

Item	1977	1978	1979	1980	1981	January-June 1982
Average number of persons employed in establishments producing helicopters:						
All persons-------	22,300	26,600	27,500	29,800	28,000	27,200
Scientists and engineers-------	3,700	3,600	3,000	3,200	3,000	3,200

Source: Aerospace Industries Association, Helicopter Manufacturing Employment, Series 11-02.

Marketing of the helicopter.--Commercial operators and large corporations are the primary purchasers of civil helicopters. Industry sources indicate that all of the helicopter manufacturers, both domestic and foreign, sell to these purchasers in basically the same fashion. Initially, attempts to generate interest in the rotorcraft are made through advertisements in trade publications. A detailed sales campagin is then undertaken. Salesmen, assigned by geographic regions visit the commercial operators, or the aviation divisions of large corporations, and attempt to solicit business for new or existing helicopters. The salesmen will stress the virtues of the producing company, its reputation in the industry, and its products. Additionally, a direct-mail program is instituted after the sales presentation is made. The potential purchasers are typically sent brochures, specifications, and press releases on any products they have expressed interest in.

Government agencies, purchasing helicopters for public service operations, will typically solicit information from several manufacturers in order to make producer and price comparisions. Salesman will then initiate the same type of sales campaign outlined above.

Major foreign competitors

Four foreign manufacturers are currently supplying helicopters in the U.S. market: Agusta (Italy), Westland (United Kingdom), MBB (West Germany), and Aerospatiale (France). All of these manufacturers are wholly or partially owned by their respective Governments. These producers also manufacture a wide range of aerospace equipment, including military, commuter and large-transport aircraft, missles, and satellites. Each of the foreign manufacturers maintains a U.S.-based office which handles sales and customer support for the U.S. market. In total, these foreign manufacturers currently market 17 light and intermediate class civil helicopter models in the domestic market. These models range from 5- to 19-passenger capacities. Industry

sources indicate that the share of the world market for civil helicopters held by these four producers was estimated to be 40 percent in 1981. Information on individual foreign producers is listed in appendix C.

Foreign Trade

Tariffs and international agreements

Helicopters imported into the United States are classified for statistical purposes under Tariff Schedules of the United States Annotated item 694.4125, "Civil Helicopters" in the Tariff Schedules of the United States Annotated (1982). The Agreement on Trade in Civil Aircraft, discussed on pages 14 and 15, provides for duty-free entry of helicopters.

U.S. imports

U.S. imports of civil helicopters increased 287.3 percent, by quantity, and 483.3 percent, by value, during 1977-81 (table 42). In January-June 1982, imports gained 18.5 percent in quantity over those in the corresponding period of 1981. However, the value of those imports declined 5.7 percent in January-June 1982 compared with the value in the corresponding period of 1981. 1/ Industry sources attribute the large increase in helicopter imports to intensified marketing efforts by foreign manufacturers in the petroleum support and corporate markets. Over the 5-year period, imports from France amounted to over 84 percent of total quantity and 73 percent in value of total imports.

1/ The decrease in the value of imports can be attributed to the importation of lighter, less expensive helicopter models for commercial and corporate use.

Table 42.--Civil helicopters: U.S. imports for consumption, 1977-81, January-June 1981, and January-June 1982

Period	Quantity	Value
	Units	1,000 dollars
1977	55	18,100
1978	74	28,000
1979	91	21,600
1980	178	54,000
1981	213	105,500
January-June--		
1981	92	50,698
1982	109	47,813

Source: Compiled from official statistics of the Department of Commerce.

Note.--Military helicopter parts from Canada have been erroneously classified as complete civil helicopters; therefore, all data on imports of helicopers from Canada have been deleted from these totals.

U.S. exports

Exports of U.S.-manufactured helicopters increased 41.1 percent in quantity and 228.4 percent in value from 1977 to 1981 (table 43). The five leading export market countries (Japan, Brazil, the United Kingdom, South Korea, and Singapore) together received over 57 percent of the total value of U.S. civil helicopter exports. Industry sources indicate that increased exports are primarily the result of the growing need for helicopters in oil exploration operations abroad. In January-June 1982, exports declined 53.3 percent, by quantity, and 35.5 percent, by value compared with the exports in the corresponding period of 1981. The decline is attributed to the worldwide recession and the high cost of financing.

Table 43.--Civil helicopters: U.S. exports, 1977-81, January-June 1981, and January-June 1982

Period	Quantity	Value
	Units	1,000 dollars
1977	321	105,500
1978	368	155,700
1979	459	206,600
1980	525	298,700
1981	453	346,500
January-June--		
1981	255	155,300
1982	119	100,100

Source: Compiled from official statistics of the U.S. Department of Commerce.

The Current U.S. Market

Description of U.S. market

A helicopter is able to take off and land vertically and can sustain flight in a hover. These qualities allow the helicopter to serve both remote and congested areas with minimum investment in facilities and equipment. Additionally, modern helicopters are now more fuel efficient and quieter to operate than older models, and in some applications, are becoming competitive with fixed-wing aircraft. The increased use of new composite materials, together with improved construction techniques, is helping to reduce both operating and maintenance costs. 1/ Helicopters are also becoming more attractive to potential users because of substantive improvements in comfort and convenience. 2/

In 1980 (the latest year figures are available), there were approximately 7,028 civil helicopters operated in the United States. 3/ The primary uses of these helicopters are offshore petroleum support, commuter airline operations, corporate use, and public service functions.

The search for oil in the Gulf of Mexico and offshore in Alaska makes these areas some of the most important markets for helicopter manufacturers. Helicopters are indispensable both in exploration and exploitation of oil. 4/ The helicopter is widely used in offshore operations moving drilling crews, technicians, support personnel, and critical equipment to and from mobile drilling rigs and production platforms. In addition, they move personnel to and from production platforms during the construction phase. The oil companies, which are the customers for these helicopter operations, are moving farther and farther offshore, demanding longer-range and higher-speed helicopters. 5/ The number of helicopter operators providing services in the Gulf of Mexico has grown dramatically, from about a dozen firms to 35 or more in the past 4 years. The largest operator serving this market employs over 300 helicopters, but there are a number of small operators with three or fewer helicopters. 6/

1/ "Helicopters," Financial Times, Feb. 26, 1981, p. 27.

2/ American Helicopters Society, Vertiflite, January/February 1981, p. 14.

3/ Directory of Helicopter Operations, Aerospace Industries Association, 1981.

4/ Mark Lambert, "The Helicopter Boom is Here," Interavia, July 1980, p. 594.

5/ William Yates, Bell Helicopter Textron, National Aeronautics and Space Administration, Assessment of Historical and Projected Segments of U.S. and World Civil and Military Rotorcraft Markets 1960-1990, 1980, p. 152.

6/ Helicopter News, August 3, 1981, p. 121.

The helicopter is also becoming a compliment to our existing air transportation system in both commercial and corporate passenger transportation. Expansion of helicopter use has been aided by improvements in helicopter reliability, ease of maintenance and fuel economy. The helicopter is able to provide point-to point-transportation not only in developed areas, but also in regions inaccessible by other means. In 1982, there were five scheduled helicopter airlines in the United States operating in New York City, N.Y., Oakland, Calif., Houston, Tex., and Los Angeles, Calif. Two of the six airlines operate, or will operate fleets, composed of foreign-made helicopters. 1/

The availability of new twin-turbine helicopter models has aided the growth of corporate helicopters. A survey performed by the National Business Aircraft Association revealed that as of December 31, 1980, its corporate members were operating 740 helicopters. This number represents a 33-percent increase over the 558 helicopters operated by members during the comparable period of 1979. 2/ Industry sources indicate that the number of helicopters used in executive transportation increased in 1981. However, industry sources indicate that the commuter and corporate market for helicopters is constrained by the lack of downtown heliports in the United States and by the problem of noise.

Additionally, in the civil role, the basic duties of offshore petroleum support and air transport are being supplemented by such tasks as aerial agriculture (including moving timber, and building power lines and roads in remote and difficult terrain, and lifting heavy loads to the tops of tall buildings), as well as a wide range of Coast Guard and public use operations. 3/

Public use helicopter operations are performed throughout the country by Federal, State, county, and metropolitan agencies charged with maintaining the protection of its citizens. Public service helicopter missions include law enforcement, emergency medical services, fire fighting, disaster relief, and land management. 4/

1/ Aerospace Industries Association, Directory of VTOL. Aircraft, 1982, 1982, p. 1.

2/ J.J. Barber, "Corporate Copters Climb in Fixed-Wing Circles," Rotor & Wing International, October 1981, p. 45.

3/ "Helicopters," Financial Times, Feb. 26, 1981, p. 27.

4/ "The Need for a Dedicated Public Service Helicopter Design," Vertiflite, July/August 1982, p. 28.

Factors influencing market demand

According to data received from U.S. helicopter operators, increasing passenger loads and expansion into new markets were cited as the two primary factors infleuncing market demand. Other less important factors noted were efficiency, the need to replace obsolete equipment, and the desire for more modern helicopter models.

Apparent U.S. consumption

During 1977-80, apparent U.S. consumption of civil helicopters increased annually, rising to 1,019 units in 1981 from 582 units in 1977, or by 75.1 percent (table 44). However, consumption decreased 18.4 percent in 1981 in response to high interest rates. The value of apparent U.S. consumption rose 151.4 percent, increasing from $163.6 million in 1977 to $411.3 million in 1980. In 1981, consumption value fell 13.4 percent. The ratio of imports to apparent consumption, by quantity, increased from 9.5 percent in 1977 to 25.6 percent in 1981. This ratio, by value, increased from 11.1 percent in 1977 to 29.6 percent in 1981. According to the most recent published industry figures, 4,254 helicopters were used in U.S. commercial operations (oil exploration, commuter and miscellaneous uses), 1,506 were used as corporate helicopters, and 1,268 were used in public service operations by the Federal, State and local governments in 1980. 1/

1/ Aerospace Industries Asociation, 1980/1981 AIA Directory of Helicopter Operators, 1982, p. 400.

Table 44.—Civil helicopters: U.S. producers' shipments, imports for consumption, exports of domestic merchandise and apparent U.S. consumption, 1977-81

(Quantity in units; value in thousands of dollars)

Year	Producers' shipments	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
	Quantity				
1977----------	848	55	321	582	9.5
1978----------	904	74	368	610	12.1
1979----------	1,019	91	459	651	14.0
1980----------	1,366	178	525	1,019	17.5
1981----------	1,072	213	453	832	25.6
	Value				
1977----------	251,000	18,100	105,500	163,600	11.1
1978----------	328,000	28,000	155,700	200,300	14.0
1979----------	403,000	21,600	206,600	218,000	9.9
1980----------	656,000	54,000	298,700	411,300	13.1
1981----------	597,000	105,500	346,500	356,000	29.6

Source: Aerospace Industries Association, Aerospace Facts and Figures 1982/83, and official statistics of the U.S. Department of Commerce.

Factors of Competition in the Market

Technology

The increases in demand for helicopters is principally a result of the availability of new and improved technology. The performance, reliability, safety, and comfort of the machines now coming into the market are making them acceptable to a new range of users. The increasing use of composites in the airframe and aerofoil has improved helicopter performance and lowered operating costs. Composites can be manufactured semiautomatically once the costly and large tooling has been installed. Several foreign and domestic manufacturers have already made these investments.

Numerous industry sources indicate that the technology level of European helicopter manufacturers has kept pace with that of U.S. firms. 1/ A recent National Aeronautics and Space Administration (NASA) study, which evaluated United States and French technology, found that each nation has areas of technical superiority. The study indicates that the United States is the

1/ Mark Lambert, "The Helicopter Boom is Here," Interavia, July, 1980, p. 594.

leader in such areas as systems integration, higher harmonic control, aeroelastic conformal blades, and engine transmissions. 1/

The accident rate for civil helicopters is significantly higher than for other categories of general aviation aircraft, partly because of the types of operations for which the majority of the fleet is used. Both foreign and domestic manufacturers are increasingly adopting protective structure and impact-resistant systems to reduce the risk of fire and injury after a heavy impact. 2/

Capital formation

In the area of capital formation, the U.S. helicopter producers strongly assert that they are at a competitive disadvantage compared with foreign manufacturers. Since foreign producers are frequently owned wholly or in part by their respective governments, they can often obtain capital in the form of loans, grants, or loan guarantees provided by the national government to develop, improve, market, and finance their products. American firms must depend on the commercial market for these funds.

Price

According to industry sources, the price of a helicopter, whether foreign or domestic, is currently at about $400 per pound empty weight, and this price will be applicable throughout the year 2000 with inflation added. 3/ The average cost of a helicopter is expected to steadily increase, for both foreign and domestic manufacturers, advancing from approximately $900,000 in 1979 to $2.5 million in 1990, with the increase resulting from inflation. 4/

Foreign Export Credit Subsidies and Their Impact on the U.S. Industry

The types of credit programs provided by most countries to encourage the export of helicopters are the same as those used to finance all exports. Details regarding official credit programs can be found in the "Export Credit Subsidies" section.

1/ NASA's Role in Aeronautics: A Workshop, Volume V Rotocraft, National Academy Press, 1981, p. 7.
2/ Op.cit., Interavia, July, 1980, p. 594.
3/ Helicopter News, Aug. 31, 1981, p. 141.
4/ Ibid., Aug. 17, 1981, p. 134.

The financing of helicopter purchases

Imported and domestically produced helicopters are generally financed through bank loans or seller financing. From 1977 to 1981, importers financed a significant share of their helicopter sales in the United States. However, most sales of imported helicopters did not involve seller financing. Importers' financing terms were significantly better than market terms when market interest rates were very high, but currently, importers terms are little better than market terms.

Sources of financing.--Helicopters are financed primarily through bank loans and seller financing, as shown in table 45. Both domestic and foreign producers offer seller financing.

Table 45.--Civil helicopters: Sources of financing and number of purchasers identifying each source, 1977-81 1/

Source	1977	1978	1979	1980	1981
Banks	5	7	7	7	7
Sellers	5	6	7	5	5
Insurance companies	2	3	4	3	2
Leasing 2/	2	3	4	3	3
Other	2	1	2	2	2

1/ Some purchasers identified more than 1 source of financing in each year.
2/ Includes lease-purchase agreements.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Sources of guarantees.--Loan guarantees can have an important effect on interest costs. A loan guarantee is a promise by a creditworthy entity to repay a loan if the borrower defaults. Because a loan guarantee can significantly reduce the risk that the lender will not be repaid, it may greatly reduce the interest rate the lender charges on the loan.

Helicopter purchasers, however, rarely use loan guarantees. Loan guarantees that they do receive are from the U.S. Government, sellers, or private individuals, as shown in table 46. No helicopter purchaser reported receiving a loan guarantee directly from a foreign government. U.S. Government loan guarantees were either from the FAA or the Small Business Administration. FAA loan guarantees are limited to companies carrying

passengers or freight for hire, so many helicopter purchasers would not qualify for these guarantees. 1/ These loan guarantees may be used in purchasing either domestic or foreign aircraft.

Table 46.--Civil helicopters: Sources of loan guarantees, and number of purchasers identifying each source, 1977-81 1/

Source	1977	1978	1979	1980	1981
Sellers	0	2	2	2	2
U.S. Government	1	2	2	2	1
Foreign governments	0	0	0	0	0
Other	2	2	2	2	2

1/ Purchasers were permitted to identify more than 1 source.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Credit terms available on domestic helicopters.--Domestic helicopters are usually financed through bank loans or seller financing. Bank loans generally carry interest rates from 0.25 to 4 percentage points above the prime rate, or the rate commercial banks charge their most creditworthy customers. This rate usually changes if the prime rate changes during the life of the loan. The extent to which the interest rate exceeds the prime rate depends on the creditworthiness of the purchaser and conditions in the credit markets. Usually from 80 to 90 percent of the value of the helicopter is financed, and the term of the loan ranges from 5 to 10 years. Since 1977, the prime rate has risen substantially and become increasingly volatile. The prime rate was 13 percent on September 30, 1982. Past values of the prime rate are shown in table 16 in the commuter aircraft section of this report.

* * * * * * *

1/ The FAA loan guarantee program will expire on Oct. 24, 1983. This program received no funding for fiscal year 1983, which began on Oct. 1, 1982. However, $50 million of funding for fiscal year 1982 is still available for use in 1983. Letter of Edward W. Simpson to Kenneth R. Mason, Oct. 6, 1982.

*   *   *   *   *   *   *

*   *   *   *   *   *   *

Credit terms available on foreign-built helicopters.--Most imported helicopters sold in the United States are not financed by the seller or by an agency of a foreign government. A significant proportion of imported helicopter sales, however, do use seller financing. In cases where foreign financing is provided, present value analysis can show the extent to which such financing reduces the cost of purchasing these aircraft. 1/ This analysis indicates that seller financing reduces the cost of the imported helicopters by from .9 percent to 4.3 percent (table 47). No purchaser that responded to the questionnaire reported receiving seller financing on an imported helicopter. * * * Agusta, with the support of the Italian government recently offered the sale of its products with a 10 percent down payment, 5 percent payment on delivery with monthly payments for 7 years, 10 months, with a variable, but low interest rate. 3/

This information indicates that credit terms offered on imported helicopters are generally within the bounds of the OECD Standstill Agreement as discussed on page 190.

Based on present-value analysis and information presented above, two typical contracts are compared. For a $510,000 helicopter contract extending for a period of 5 years, one contract calls for the financing of 80 percent of the value of the helicopter at a 13.5-percent interest rate; the other calls

1/ Present-value analysis is briefly described in app. D.
2/ * * *.
3/ Helicopter News, July 5, 1982, p. 112.

for financing of 90 percent of the value at a 15-percent interest rate. 1/ Because market interest rates vary with the creditworthiness of the purchaser, three different market interest rates (14, 15, and 16 percent) were used in this comparison.

Table 47.--Civil helicopters: Effects of financing on the cost of purchasing helicopters

Actual interest rate	Assumed market interest rate								
	14 percent			15 percent			16 percent		
	Present value	Savings		Present value	Savings		Present value	Savings	
Percent			Percent			Percent			Percent
13.5	$505,469	$ 4,531	.9	$496,622	$13,378	2.6	$488,051	$21,949	4.3
15	520,291	-10,291	-2.0	$510,000	-	-	$500,032	9,968	2.0

Source: Estimated by the staff of the U.S. International Trade Commission.

Sales experience of the U.S. industry, January 1977-September 1982

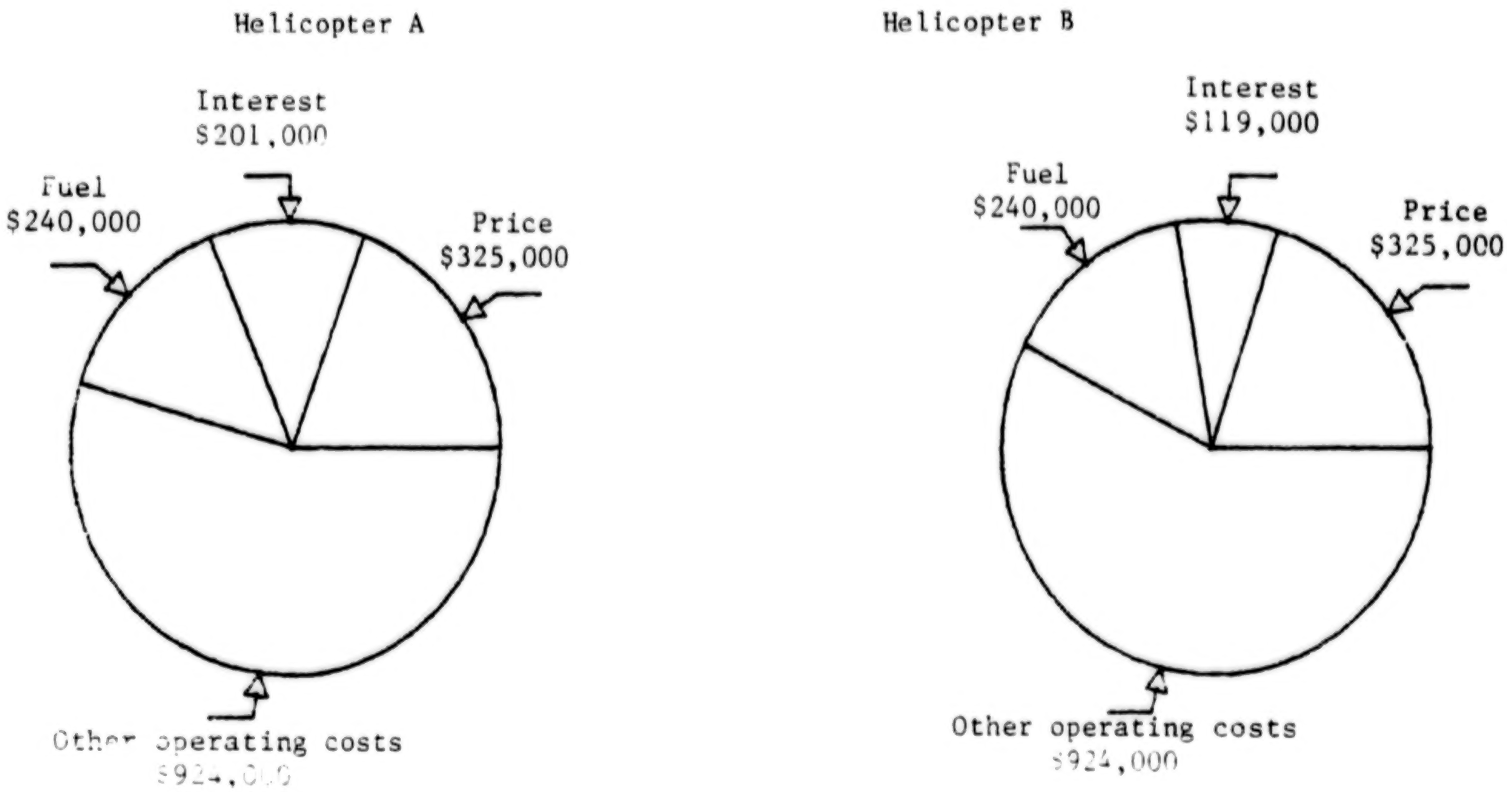
Volume of lost sales.--According to data received in response to industry questionnaires, domestic producers of civil helicopters indicate that they have not lost any U.S. sales during January 1977-September 1982 due to export credit financing. However, in foreign markets, * * *.

Purchasing criteria.--In the Commission's questionnaries, purchasers were asked to rank the criteria used in making their purchasing decision. Those criteria and the distribution of the operators' costs are based on actual experiences provided in response to Commission questionnaires. 1/ Although export credits can reduce the cost of purchasing civil helicopters, other criteria are considered more important to those operators in deciding on a helicopter to purchase. Without subsidized financing, interest costs are 11.9 percent of total operating costs, compared with 7.1 percent with subsidized financing. As demonstrated in the graphs, the financing package does alter significantly the cost

1/ Present-value analysis is described in App. D. Both contracts call for constant total payments made each month.

to the purchaser of the helicopter. In the hypothetical example, shown in figure 5, choosing helicopter B would save the purchaser more than $82,000 in interest, or about $11,714 annually during the loan period. Interest savings would be larger on a more expensive helicopter.

Figure 5.--Effects of subsidized export credits applied to U.S. civil helicopters.



Helicopter A		Helicopter B	
Price	$325,000	Price	$325,000
Amount financed	$293,000	Amount financed	$293,000
Interest rate	16 percent	Interest rate	10 percent
Years financed	7 years	Years financed	7 years
Operating life	10 years	Operating life	10 years
Total operating cost	$1,690,000	Total operating cost	$1,608,000

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

1/ The relationship of the cost components are based on an average of typical operating experiences, as reported by domestic commuter airlines.

Likely Future Trends in the U.S. Market

According to major helicopter manufacturers, sales of new civil helicopters will experience a sharp growth cycle, increasing slightly in 1982 and 1983, and improving significantly in 1984. 1/ During the next decade, the civil helicopter market is expected to grow at a faster rate than that of other aviation markets. Industry sources indicate that the civil helicopter industry will be less subject to economic stresses than other aviation sectors. Significant trends evident in the civil helicopter industry include continued development of new markets along with growing strength in those already established; ability of operators to diversify into new markets when activity in established markets decline; major capital expenditures by manufacturers to expand production facilities; and the introduction of large (20- to 40-passenger) helicopters, which should spur interest in heavyweight helicopters. 2/

In the past, there have been strong technical relationships in the design of military and civil models. However, because civil and military helicopters are now evolving separately, most military derivatives for civil use are expected to disappear and be replaced by helicopters built for specific applications in the next decade. 3/

The U.S. helicopter fleet is expected to increase from about 8,000 in 1982 to more than 20,000 by 1990. 4/ The world market, is projected at $12.5 billion during the next decade (table 48).

Table 48.—Civil helicopters: Estimated world market, by classes, 1982-90

(In thousands of dollars)

Market	Light	Intermediate	Medium	Heavy	Total
United States	3,800,000	2,300,000	500,000	-	6,600,000
Other	1,800,000	2,200,000	1,800,000	100,000	5,900,000
Total	5,600,000	4,500,000	2,300,000	100,000	12,500,000

Source: "1982-1991 Helicopter Markets," Flight International, Nov. 6, 1982, p. 1,401.

1/ "Industrial Uses Expected to Spur Helicopter Sales," Aviation Week and Space Technology, Mar. 8, 1982, p. 262.
2/ Edwin J. Bulban, "Civil Helicopter Growth Seen Through 1986," Aviation Week and Space Technology, Mar. 9, 1981, pp. 240 and 242.
3/ "Sikorsky Sees Strong Helicopter Market Growth," Aviation Daily, Sept. 9, 1980, p. 40, and "Business Helicopter Directory," Flight International, July 11, 1981, p. 106.
4/ Robert R, Ropelewski, "Civil Helicopter Growth Seen in 1981," Aviation Week and Space Technology, Feb. 2, 1981, p. 41.

Taking into account the sale of spare parts, potential helicopter and component sales during 1982-91 can double, growing to $25 billion. 1/ The largest demand, in terms of total shipment value, for civil helicopters, will be in the intermediate class, used for business transportation, commuter shuttles, and for offshore oil-drilling support. 2/ Data received in response to industry questionnaires indicate that most U.S. operators plan to purchase turbine helicopters in the intermediate class (passenger capacity of 2-7 persons) over the next 5 years (table 49). Respondents indicate intentions to purchase * * * helicopters of all types during 1982-86.

Table 49.--Civil helicopters: Future contract awards, by types and by seating capacities, 1982-86

(In units)

Item	1982	1983	1984	1985	1986	Total
Piston engine(s):						
2 to 4----seats--:	***	***	***	***	***	***
5 to 7----do----:	***	***	***	***	***	***
Total----:	***	***	***	***	***	***
Turbine engine(s):						
2 to 4----seats--:	***	***	***	***	***	***
5 to 7----do----:	***	***	***	***	***	***
8 to 11----do----:	***	***	***	***	***	***
12 to 22----do----:	***	***	***	***	***	***
23 to 33----do----:	***	***	***	***	***	***
Over 33----do----:	***	***	***	***	***	***
Total----:	***	***	***	***	***	***
Grand total----:	***	***	***	***	***	***

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

One of the markets responsible for the predicted growth in the demand for helicopter is the offshore oil industry. The number of helicopters used for drilling support is expected to increase dramatically during the next decade as new areas are opened for oil exploration. The U.S. Government alone plans to open approximately 200 million acres for oil exploration during 1982 and 1983. This is expected to add to the demand for medium and heavy helicopters. 3/ Data received from U.S. industry questionnaires indicate that

1/ "Helicopters," Financial Times, Feb. 26, 1981, p. 27.
2/ "The Role of the Intermediate- Size Helicopter as a Utility Vehicle is Steadily Growing," ICAO Bulletin, April 1982.
3/ Robert Torgerson, "Large, Heavy Lift Helicopters Well-Suited for Rigorous Offshore Operations," ICAO Bulletin, April 1982, and Erwin J. Bulban, "Continued Growth Seen in Helicopter Markets," Aviation Week and Space Technology, June 8, 1981, p. 281.

over 25 percent of the planned helicopters purchases during 1982-90 will be used in support of the petroleum industry.

The anticipated demand for new civil helicopters may, in part, be filled by imports. If continued import penetration in the U.S. market occurs, the domestic helicopter industry and related supplier industries will be affected. The impact on U.S. employment and output of such production not undertaken by U.S. firms is shown on page 43.

HEAVY ELECTRICAL EQUIPMENT

The Structure of the U.S. Industry and that of Major Foreign Competitors

Product description

The heavy electrical equipment covered in this report is limited to four types of electrical apparatus used in the generation and transmission of electric power. They are (1) power circuit breakers rated at 242,000 volts (242 KV) and greater, (2) power transformers rated over 10,000 kilovolt amperes (kVA), (3) steam turbine generator units rated at 10 million watts (10 MW) and greater, and (4) steam gas turbine generator units rated at 5 MW and greater.

Power circuit breakers.--Power circuit breakers are devices which provide electrical equipment with protection from catastrophic failure during a period of excessive circuit overload. When a circuit overload reaches some predetermined power level, the circuit breaker opens automatically, disabling the circuit. The disabling is achieved through the separation of a set of contacts within the breaker by either an electromagnetic, pneumatic, or hydraulic force. The opening of the set of contacts in the breaker, however, collapses the electrical field in which the breaker was placed, producing an arc of high-temperature ionized gas. The ionized gas continues to conduct the electrical circuit across the open contacts of the breaker. The design of all breakers is principally determined by how the high-temperature gas arcs are extinguished within the breaker.

In most breakers, either oil or a high-pressure gas blast is used as a medium for quenching the high-temperature arc. The gas blast is composed of either compressed air or compressed sulphur hexafluroide (SF_6) gas. In oil circuit breakers, as the ionized arc is drawn through the oil, the oil is decomposed by the intense heat of the arc, creating gas and other byproducts whose rapid expansion extinguishes the heat of the arc. The arc is usually extinguished at a point in the alternating current phase when a zero voltage value is reached. In gas breakers, the dielectric constant (insulating ability) of the gases is essential to obtain and maintain the desired open circuit.

Power transformers.--Power transformers are electrical devices which are used largely to step up (increase) or step down (reduce) output generator and powerline voltages. Output generator voltages are stepped up for long-distance electrical transmission, since power losses are lower at higher transmission voltages. At the terminating end of the high-voltage transmission, power transformers are used to step down the voltage to the desired distribution level.

A transformer is constructed from two or more coils of wire which are wound around a laminated iron core. When a voltage is impressed on the tranformer's primary coil, a voltage, usually of a different value, is induced in the other winding (secondary winding). The voltage induced in the secondary winding is directly proportional to the turns ratio of the two windings. Thus, the ratio of input and output voltages of the transformer depends on the construction of the windings.

Turbine generator units.--The turbine generator units covered in this report are limited to two types of land-based units, each consisting of a turbine as a prime mover coupled on a common shaft to an electric generator. The principal difference between the two types of units is the manner in which fuel is combusted or expended to provide the energy necessary to drive the turbine. In the steam turbine, heat obtained from the combustion of fossil fuel or from a controlled nuclear reaction is used to produce high-pressure steam which is passed across and through the "buckets" (blades) of the turbine rotor. The rapid passage of steam through the turbine causes the rotor to move, creating a mechanical force (torque) which in turn is converted into electrical energy by the generator. Fossil-fuel-fired steam turbines operate at higher temperatures and pressures than nuclear-fired turbines, causing considerable design differences to exist between the two. Nuclear steam turbine generators in general are larger, heavier, and more expensive than those employed in fossil-fuel-fired systems.

Compared with steam turbines, gas turbines are smaller and more self-contained units which largely consist of a compressor, a combustor, and a turbine. In the gas turbine, air is taken from the atmosphere by the compressor and is forced into the combustor where it is mixed with fuel and heated. The gaseous by products created from the expansion during combustion are directed through the turbine, forcing the rotor to move. Gas turbine generators are relatively simple and compact devices, making them an ideal source for standby or emergency power. Gas turbine generator units are also used with steam turbine generator units to provide supplemental power during periods of peak demand loading.

The U.S. industry

U.S. producers.--The heavy electrical industry in the United States consists of about nine producers, some of which have European ownership. The principal producers are the General Electric Co. and Westinghouse Electric Corp., which together account for a large share of total industry shipments. These two firms produce a full line of heavy electrical equipment both for markets in the United States and for markets in other countries. The remaining U.S. producers specialize in one or more products areas, but in most cases, they do not approach the scale of operations or production capabilities of the two leaders.

The principal domestic producers which have European ownership are Brown-Boveri Turbo-Machinery, Inc., a wholly owned subsidiary of Brown Boveri of Switzerland, and Siemens-Allis, Inc., a majority-owned subsidiary of Siemens, AG, of West Germany. Brown-Boveri Turbo-Machinery was established in the United States through the acquisition of the Studebaker-Worthington gas turbine business and the ITE Circuit Breaker Division of Gould, Inc. Siemens-Allis, Inc., was established by the acquisition of the circuit breaker and steam turbine business formerly owned by the Allis-Chalmers Corp. RTE-ASEA, Inc., is also a domestic producer jointly owned by European interests in Sweden, and RTE Corp. of the United States.

In addition to these European firms, the General Electric Co. produces power circuit breakers in the United States in a joint venture with Hitachi, Ltd. (Japan). The joint venture, called High Voltage Breakers, Inc., was formed in 1978 and gave General Electric access to Hitachi's SF_6 power circuit breaker technology. General Electric had previously used air-blast technology in the construction of circuit breakers. * * *.

U.S. shipments.--U.S. producers' shipments of heavy electrical equipment (domestic and export) increased from about * * * in 1977 to * * * in 1981, reflecting the slow growth in the consumption of electric power. Shipments of steam turbine generator units were the largest product segment, accounting for about 50 percent of producers' shipments during the period. Shipments of power circuit breakers accounted for the smallest share. The data on U.S. producers' shipments of all product segments of heavy electrical equipment are shown in table 50.

Power circuit breakers.--U.S. shipments of power circuit breakers increased from * * * in 1977 to * * * in 1980 and then decreased to * * * in 1981. The number of units shipped during the period ranged from * * * units in 1977 to * * * units in 1981. Units shipped at the beginning of the period were larger in size and higher in power rating than those shipped at the end of the period.

Power tranformers.--Shipments of power transformers rose by about 18 percent during 1977-81, increasing from * * * million in 1977 to * * * in 1981. The number of transformers shipped during the period reached a low of * * * in 1978 and a high of * * * units in 1980. The power rating of the units shipped fluctuated between 82 mVA and 115 mVA.

Steam turbine generator units.--Although only * * * steam turbine generator units were shipped during 1977-81, their combined value exceeded * * *, and their combined average power rating reached 2,255 MW. The value of shipments and the average power rating of the equipment were higher, however, during the beginning of the period than during the end of the period. Shipments were valued at * * * in 1981, compared with * * * in 1977, representing a decrease of about 9 percent.

Gas turbine generator units.--Unlike shipments of large, steam turbine generator units, shipments of smaller, gas turbine generator units increased during 1977-81 both in value and unit size. In 1977, shipments were valued at * * *, with an average rating of 28MW; in 1981, shipments were valued at * * *, with an average rating of 73 MW. Shipments reached a peak in 1980 when producers delivered * * * valued at * * *.

Table 50.--Heavy electrical equipment: U.S. producers' shipments, 1/ by types, 1977-81

Year	Power circuit breakers			Power transformers		
	Units	Average rating	Value	Units	Average rating	Value
		KV	1,000 dollars		KVA	1,000 dollars
1977	313	369	***	1,077	94,679	***
1978	316	349	***	983	108,314	***
1979	343	343	***	1,008	115,208	***
1980	358	363	***	1,140	81,908	***
1981	298	340	***	1,049	97,697	***
	Steam turbine generator units			Gas turbine generator units		
	Units	Average rating	Value	Units	Average rating	Value
		MW	1,000 dollars		MW	1,000 dollars
1977	56	474	***	155	28	***
1978	43	620	***	112	31	***
1979	43	493	***	111	41	***
1980	48	364	***	135	47	***
1981	48	304	***	100	73	***

1/ Includes domestic and export/shipments.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. domestic shipments.--U.S. producers' shipments of heavy electrical equipment to markets in the United States accounted for a large share of total shipments during 1977-81, although shipments of gas turbine generator units to foreign markets were larger. Domestic shipments were valued over * * * each year during the period and constituted 70 percent of total shipments. Power transformers and steam turbine generator units were the product shipments with the highest reported value. Domestic shipments are shown in table 51 by product groups and by average power or voltage ratings.

Table 51.--Heavy electrical equipment: U.S. producers' domestic shipments, by types, 1977-81

Year	Power circuit breakers			Power transformers		
	Units	Average rating	Value	Units	Average rating	Value
		KV	1,000 dollars		KVA	1,000 dollars
1977	302	373	***	1,015	97,824	***
1978	310	351	***	942	111,539	***
1979	310	354	***	966	118,096	***
1980	348	367	***	1,073	79,797	***
1981	228	343	***	975	94,099	***
	Steam turbine generator units			Gas turbine generator units		
	Units	Average rating	Value	Units	Average rating	Value
		MW	1,000 dollars		MW	1,000 dollars
1977	46	546	***	19	39	***
1978	36	660	***	21	43	***
1979	38	464	***	17	56	***
1980	28	498	***	14	49	***
1981	35	322	***	21	48	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. contract awards.--U.S. producers reported that the value of contracts they received during 1977-81 for heavy electrical equipment averaged in excess of * * * each year during the period, or about * * * total. Despite their size, however, these awards were about * * * percent below the value of U.S. producers' shipments reported during the period. Contract awards for circuit breakers declined by 21 percent of shipments, and awards for steam turbine generator units declined by 16 percent of shipments. Contract awards as a share of shipments were higher for the other product groups, as shown in table 52.

Table 52.--Heavy electrical equipment: U.S. producers' contract awards, 1/ by types, 1977-81

Year	Power circuit breakers			Power transformers		
	Units	Average rating	Value	Units	Average rating	Value
		KV	1,000 dollars		KVA	1,000 dollars
1977	270	371	***	827	100,236	***
1978	349	378	***	996	113,450	***
1979	277	364	***	1,142	97,276	***
1980	248	357	***	1,061	92,084	***
1981	172	369	***	805	87,798	***
	Steam turbine generator units			Gas turbine generator units		
	Units	Average rating	Value	Units	Average rating	Value
		MW	1,000 dollars		MW	1,000 dollars
1977	41	399	***	127	33	***
1978	40	343	***	113	40	***
1979	36	290	***	94	45	***
1980	34	172	***	103	42	***
1981	51	217	***	132	41	***

1/ Includes contract awards received from domestic and foreign sources.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. domestic contracts awards.--Contract awards received by U.S. producers of heavy electrical equipment from domestic purchasers amounted to * * * and accounted for about 64 percent of total awards received during 1977-81. Domestic purchasers accounted for 96 percent of power circuit breaker awards and 93 percent of power transformer awards, but only 21 percent of gas turbine generator awards. Domestic purchasers also accounted for 78 percent of steam turbine generator awards during the period. Awards received during the period are shown, by product groups, in table 53.

Table 53.--Heavy electrical equipment: U.S. producers' domestic contract awards, by types, 1977-81

Year	Power circuit breakers			Power transformers		
	Units	Average rating	Value	Units	Average rating	Value
		KV	1,000 dollars		KVA	1,000 dollars
1977	261	376	***	769	104,288	***
1978	346	379	***	946	114,695	***
1979	257	373	***	1,041	93,154	***
1980	247	357	***	1,007	91,919	***
1981	154	384	***	750	85,524	***
	Steam turbine generator units			Gas turbine generator units		
	Units	Average rating	Value	Units	Average rating	Value
		MW	1,000 dollars		MW	1,000 dollars
1977	39	415	***	15	56	***
1978	29	428	***	10	68	***
1979	18	263	***	12	52	***
1980	22	132	***	17	47	***
1981	24	309	***	30	45	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

U.S. foreign contract awards.--Awards received by U.S. producers from foreign purchasers during 1977-81 largely covered contracts for turbine generator units. Contracts received for power circuit breakers and power transformers were relatively small, accounting for only 3 percent of the value of foreign awards. The largest awards covered gas turbine generator units, which increased in value from * * * in 1977 to * * * in 1982. Awards received from foreign sources for steam turbine generator units were smaller, but increased faster, rising from * * * in 1977 to * * * in 1981. Awards received from foreign purchasers during the period are shown in table 54.

Table 54.--Heavy electrical equipment: U.S. producers' foreign contract awards, by types, 1977-81

Year	Power circuit breakers			Power transformers		
	Units	Average rating	Value	Units	Average rating	Value
		KV	1,000 dollars		KVA	1,000 dollars
1977	9	242	***	58	46,517	***
1978	3	242	***	50	49,150	***
1979	20	242	***	101	139,763	***
1980	1	242	***	54	95,167	***
1981	18	242	***	55	118,807	***
	Steam turbine generator units			Gas turbine generator units		
	Units	Average rating	Value	Units	Average rating	Value
		MW	1,000 dollars		MW	1,000 dollars
1977	2	76	***	112	29	***
1978	11	120	***	103	37	***
1979	18	316	***	82	44	***
1980	12	245	***	86	42	***
1981	27	136	***	102	40	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Capacity.--During 1977-81, U.S. producers' production capacity remained * * * except in the production of power circuit breakers. In 1977, capacity in that product area was declining due to a prior decision by a major domestic producer to cease production. As a result of the staged reduction in production at these facilities, capacity utilization in the circuit breaker industry in 1977 was * * *. In 1981, capacity to produce circuit breakers stood at * * *, or * * * of 1977 level. Other than power circuit breakers, capacity utilization rates in other product groups ranged between * * * and * * * percent of capacity in 1981, * * * significantly from 1977 levels. Capacity and the capacity utilization rates for the heavy electrical industry during 1977-81 are shown in table 55.

Table 55.--Heavy electrical equipment: U.S. producers' capacity, production, 1/ and capacity utilization, 1977-81

Year	Power circuit breakers: Capacity	Power circuit breakers: Pro-duction	Power circuit breakers: Capacity utilization rate	Power transformers: Capacity	Power transformers: Pro-duction	Power transformers: Capacity utilization
	MV	MV	Percent	MVA	MVA	Percent
1977	***	***	***	***	***	***
1978	***	***	***	***	***	***
1979	***	***	***	***	***	***
1980	***	***	***	***	***	***
1981	***	***	***	***	***	***

Year	Steam turbine generator units: Capacity	Steam turbine generator units: Pro-duction	Steam turbine generator units: Capacity utilization rate	Gas turbine generator units: Capacity	Gas turbine generator units: Pro-duction	Gas turbine generator units: Capacity utilization
	GW	GW	Percent	GW	GW	Percent
1977	***	***	***	***	***	***
1978	***	***	***	***	***	***
1979	***	***	***	***	***	***
1980	***	***	***	***	***	***
1981	***	***	***	***	***	***

1/ Because inventories are * * * in this industry, U.S. producers' shipments are used in place of production.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Investment expenditures.--Investment in the heavy electrical industry increased from * * * in 1977 to * * * in 1981. During the period, about * * * of the investment was directed toward research and development and 51 percent was directed to the purchase of machinery and equipment and plant improvements. Investment expenditures were not reported by product sectors in the industry (table 56).

Table 56.--Heavy electrical equipment: U.S. producers' investment expenditures, 1977-81

(In thousands of dollars)

Item	1977	1978	1979	1980	1981
Real estate, plant, and equipment	***	***	***	***	***
Research and development	***	***	***	***	***
Total	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Profitability.--The profit-and-loss experience of U.S. producers of heavy electrical equipment during 1977-81 is summarized in table 57. Data were compiled by individual heavy electrical product lines and for the overall operations of the reporting establishments in which heavy electrical equipment was produced. Profit-and-loss data for steam and gas turbine generator units were combined due to the inextricable nature of certain corporate expenses charged to these two lines of business.

Power circuit breakers.--U.S. producers' manufacturing operations on power circuit breakers * * * during 1977-81. U.S. producers recorded net operating * * * in 1977 and * * * in 1981, and registered net operating * * * approximately * * *, * * *, and * * * during 1978-80, respectively. A * * * in sales revenues in 1981 and a * * * in general, selling, and administrative expenses in 1981 contributed to this reversal.

Power transformers.--Producers experienced a net operating * * * on their power transformer operations of * * * in 1977; profit then declined, and there was a * * * million in 1981. The ratio of net operating profit or loss to net sales consequently dropped from a profit of * * * percent in 1977 to * * * percent in 1981. This downward pressure on profits was associated with a 64 percent increase in general, selling, and administrative expenses between 1977-81 and an increase in the cost of goods sold from approximately 75 percent of net sales in 1977 to nearly 86 percent of net sales in 1981.

Table 57.--Profit-and-loss experience of U.S. producers on their operations on heavy electrical equipment and on the overall operations in establishments in which heavy electrical equipment was produced, by product lines, 1977-81

*   *   *   *   *   *   *

Steam and gas turbine generator units.--U.S. steam and gas turbine generator unit production operations recorded a * * * million in 1977, and profits from * * * to * * * during 1978-80; profits declined to * * * in 1981. With the exception of 1978, general, selling, and administrative expenses charged to these operations increased annually from * * * million in 1977 to * * * million in 1981, or by 56 percent. Profits, however, generally tracked increases or declines in the percentage of cost of goods sold to net sales.

The ratio of sales of heavy electrical equipment to the sales generated by all equipment and operations declined during the period from approximately 51 percent in 1977 to 46 percent in 1981. The operations unrelated to heavy electrical equipment thus represented only from 49 to 54 percent of total sales between 1977-81; however, their contribution to total profits ranged from 80 percent in 1977 to over 100 percent in 1981, when heavy electrical equipment operations recorded a * * *.

Employment.--Employment in the heavy electrical industry during 1977-81 decreased by about 25 percent. Production and related workers decreased from * * * persons to * * * persons, or by nearly 28 percent during the period, and all persons employed on heavy electrical equipment decreased by 24 percent from * * * workers in 1977 to * * * workers in 1981. Workers employed on all products in establishments where heavy electrical equipment was produced decreased by only 20 percent, as shown in table 58.

Power circuit breakers.--Employment on power circuit breakers showed the second steepest rate of decline among the product categories during the period. In 1977, * * * persons, including * * * production and related workers, were employed in the production of power circuit breakers. In 1981, all persons employed had decreased to * * * persons, including * * * production and related workers. The largest decrease occurred in 1981, when employment fell by 12 percent.

Power transformers.--Employment on power transformers decreased from * * * persons in 1977 to * * * persons, in 1981, or by about 20 percent. Production and related workers, on the other hand, decreased from * * * persons to * * * persons, or by 25 percent. Much of the decrease in employment on power transformers took place in 1978 and 1981.

Steam turbine generator units.--Much of the employment lost in the heavy electrical industry during 1977-81 was lost in the steam turbine generator sector. During the period, all persons decreased by * * * workers, and production and related workers decreased by * * * workers. As was also the case with power transformers, employment on steam turbine generators fell steadily throughout the period.

Gas turbine generator units.--The gas turbine generator sector was the only product group in which employment increased during the period. In 1981, employment of all persons reached * * * workers, or about 5 percent over the number in 1977, and production and related workers reached * * * persons, or about 10 percent over the number in 1977. Employment increased

Table 58.--Average number of employees in U.S. establishments producing heavy electrical equipment and production and related workers directly engaged in the production of all products and heavy electrical equipment, by product lines, 1977-81

*   *   *   *   *   *   *

steadily throughout the period, with the exception of 1979, with the largest increase taking place in 1980.

Barriers to entry into the industry.--Production of heavy electrical equipment, with the possible exception of lower voltage circuit breakers and transformers, is extremely capital intensive. Replacement values for certain types of production process equipment can range from $10 million to $30 million. A typical facility to produce gas and steam turbine generators in the United States can cost several hundred million dollars at current market replacement values. It is unlikely that such investment could be economically justified given the current market for electrical equipment.

Long production lead times, particularly with respect to steam turbine generator units, represent another major impediment to entry into the heavy electrical equipment industry. Lead times commonly range from 6 months to 1 year for circuit breakers and up to 5 years for a large steam turbine generator unit. Sales contracts for this equipment rarely provide for progress payments by the purchaser of more than 10 percent of the contract price prior to delivery. Thus, a new entrant into this market must be financially capable of sustaining the cost of substantial work-in-process inventories.

Certainly the most important nonfinancial deterrent to new heavy electrical equipment industry entrants, and possibly the most important overall restriction, concerns the perception or qualification of an equipment supplier by the potential customer. Because of the financial size of contracts and the heavy costs of equipment failures associated with service outages and standby generating losses, the potential customer will go to great lengths to determine whether a new supplier, either foreign or domestic, is capable of producing reliable and efficient equipment. Such a reputation is often gained only after years of producing consistently high levels of product quality. A new entrant in the industry would have a difficult time overcoming this barrier without acquiring the facilities of an established producer.

Marketing of heavy electrical equipment.--Investor and public utilities and electric cooperatives are the principal U.S. customers for heavy electrical equipment. There are over 200 of these U.S. entities, but 80 utilities currently account for 95 percent of U.S. electric generating capacity. U.S. and foreign producers of heavy electrical equipment market their equipment to these potential customers in essentially the same manner.

The requirements for equipment by the utilities are normally projected in advance and are well known to the technical representatives of the various domestic and foreign producers. Initial contacts with the utilities are almost always initiated by their field agents. These agents are most often highly trained personnel with considerable technical knowledge of heavy electrical equipment and electric-power-generating systems. Contacts by the agents may either be on a routine basis, or, where specific or unannounced utility purchases are anticipated, more formal inquiries may be made concerning the type of equipment or installation which might be under consideration. Depending upon the size of the prospective contract, as talks

progress, higher levels of the suppliers' and purchaser's management teams will usually become involved in the discussions.

The size and financial strength of the utility, however, will have a large effect upon the scope and direction of the discussions. In most cases, major utilities which have substantial financial and technical resources need little technical input from the producer. In contrast, smaller utilities often solicit the technical expertise of the producer or will hire an independent consultant to objectively evaluate equipment alternatives. The producer often provides the utility with historical data available through the Edison Electric Institute and other public sources on the reliability of the producers' equipment which is in service. The information the producer provides enables the utility to "qualify," or selectively screen the manufacturers which the utility believes have the technical and financial ability to supply equipment of acceptable reliability and efficiency.

Qualified producers are then required to submit technical and cost proposals on each procurement, along with any qualifying contractual conditions, to the utility. After an evaluation is conducted by a technical team from the utility, an award is usually made on the basis of the lowest evaluated price. The lowest evaluated price, however, could be a price other than the lowest nominal price, since efficiency, material and labor escalation costs, and other considerations would affect the price. In accordance with the provisions of the Buy American Act, when the lowest evaluated price submitted by a foreign producer is not more than 6 percent lower than the price submitted by a domestic producer, a public utility must make the award to the domestic producer.

Major foreign competitors

There are about 30 large producers of heavy electrical equipment outside the United States. Of these 30 producers, 10 account for much of foreign production and are multinational competitors for U.S. producers. These 10 producers consist of 6 European and 4 Japanese firms. The European firms are Brown-Boveri (Switzerland), Siemens/Kraftwork Union (West Germany), ASEA (Sweden), General Electric Co. (United Kingdom, not affiliated with the General Electric Co. of the United States), Elin Union (Austria), and Alsthom Atlantique (France). The Japanese firms are Hitachi, Ltd., Mitsubishi Electric Heavy Industries, Toshiba, and Fuji Electric. Most of the firms operate establishments around the world including some in the United States.

Foreign Trade

Tariff and international agreements

Imported heavy electrical equipment, of the type considered in this study, are identified for U.S. tariff purposes under a number of provisions of the Tariff Schedules of the United States Annotated (TSUSA). These provisions are summarized in table 59.

Table 59.--Heavy electrical equipment: U.S. rates of duty, present and negotiated, and (GSP) and (LDDC) status, by Tariff Schedules of the United States (TSUS) items, 1982

(Percent ad valorem)

TSUS item No. 1/	Description	Present col. 1 rate of duty 2/	Negotiated col. 1 rate of duty 3/	Present col. 2 rate of duty 4/	LDDC 5/
660.30A	Steam turbines and parts thereof.	7.5	6/	20	6/
660.62A	Other (nonpiston-type engines, except for aircraft).	5.0	6/	35	6/
682.07A	Other (transformers of 1 kva and above).	4.7	2.4	35	2.4
682.60A*	Other (generators, generator sets, etc.).	5.8	3.0	35	3.0
685.90A*	Electrical switches, relays, fuses, etc.	7.3	5.3	35	5.3

1/ The designation "A" or "A*" indicates that the item is currently designated as an eligible article for duty-free treatment under the U.S. Generalized System of Preferences (GSP). "A" indicates that all beneficiary developing countries are eligible for GSP. "A*" indicates that certain of these countries, specified in general headnote 3(c) of the Tariff Schedules of the United States Annotated, are not eligible. The GSP, under title V of the Trade Act of 1974, provides duty-free treatment of specified eligible articles imported directly from designated beneficiary developing countries. GSP, implemented by Executive Order No. 11888 of Nov. 24, 1975, applies to merchandise imported on or after Jan. 1, 1976, and is scheduled to remain in effect until Jan. 4. 1985.

2/ Rate in effect Jan. 1, 1982. The rates of duty in rate of duty column numbered 1 are most-favored-nation (MFN) rates, and are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(f) of the TSUS. However, such rates would not apply to products of developing countries which are granted preferential tariff treatment under the GSP or under the "LDDC" rate of duty column.

3/ Final rate negotiated under the Tokyo round of the Multilateral Trade Negotiations (MTN), to be achieved through 8 annual staged duty reductions effective Jan. 1, 1987.

4/ The rates of duty in rate of duty column numbered 2 apply to imported products from those Communist countries and areas enumerated in general headnote 3(f) of the TSUS.

5/ The rates of duty in rate of duty column "LDDC" are preferential rates (reflecting the full U.S. MFN concessions rate for a particular item without staging) and are applicable to products of the LDDC's designated in general headnote 3(d) of the TSUS which are not granted duty-free treatment under the GSP. If no rate duty is provided in the "LDDC" column for a particular item, the rate of duty provided in col. 1 applies.

6/ Duty was not reduced.

Source: Federal Register, Presidential Proclamation No. 4707, 44 F.R. 72348, Dec. 13, 1979, and TSUSA.

U.S. imports

Power circuit breakers.--Imports of circuit breakers of 242 KV and greater increased from $884,000 in 1977 to $10.7 million in 1980, or by more than elevenfold before declining by slightly more than 9 percent to $9.7 million in 1981 (table 60). The single largest import source in terms of share of the total value of imports of circuit breakers was France which share ranged from a high of 74 percent in 1978 to a low of 48 percent in 1981. The only other important import sources during the period were Japan and Switzerland which accounted for 30 and 23 percent, respectively, of the total value of imports in 1981.

Table 60.--Circuit breakers rated at 242 KV and greater: U.S. imports for consumption, by principal sources, 1977-81

(In thousands of dollars)

Source	1977	1978	1979	1980	1981
France	634	1,579	3,541	6,173	4,603
Switzerland	70	-	1,181	1,118	1,960
Japan	-	514	1,255	2,734	2,862
All other	180	39	-	630	243
Total	884	2,132	5,977	10,655	9,668

Source: Compiled from official statistics of the U.S. Department of Commerce and from data submitted in response to questionnaires of the U.S. International Trade Commission.

Power transformers.--Imports of transformers rated over 10,000 kVA declined from $24.6 million in 1977 to $16.4 million in 1978, rose to $31.4 million in 1980 and then declined to $21.4 million in 1981 (table 61). Prior to 1979, Sweden was the single most important contributor to the total value of import shipments. Since then, Canadian shipments, principally from U.S. subsidiaries, have been predominant. The decline in imports in 1981 is thought to be associated with reduced production backlogs, particularly of U.S. and Swedish firms, over the last few years in conjunction with a significant decline in new U.S. orders for transformers.

Table 61.--Transformers rated over 10,000 kVA: U.S. imports for consumption, by principal sources, 1977-81

(In thousands of dollars)

Source	1977	1978	1979	1980	1981
Canada	170	3,871	10,255	10,826	6,764
Sweden	15,762	6,529	3,648	7,350	4,480
West Germany	429	3,022	4,180	4,674	4,848
Japan	-	1,760	-	3,948	3,307
Austria	-	-	749	2,464	1,317
United Kingdom	7,048	223	-	-	109
All other	1,238	1,019	1,003	2,090	595
Total	24,641	16,424	19,835	31,352	21,420

Source: Compiled from official statistics of the U.S. Department of Commerce and from data submitted in response to questionnaires of the U.S. International Trade Commission.

Steam and gas turbine generator units.--Most, if not all, of the steam and gas turbine generator units included here which have been imported into the United States since 1977 appear to have been shipped broken down into major subassemblies and parts of complete units. This is a practice which is apparently employed in order to facilitate shipment of an entire unit to its eventual U.S. construction site. These assemblies and parts may also be entered in stages as construction proceeds on a power-generating station. Thus, it is extremely difficult or impossible to account for imports of individual generator units. Imports of steam and gas turbine generator units as reported by respondents to Commission questionnaires were negligible during 1977-81.

U.S. exports

Power circuit breakers.--U.S. producers' exports of power circuit breakers, all of which had an average rating of 242 KV, increased erratically from * * * units, valued at * * *, in 1977 to * * * units, valued at * * * million, in 1979 before declining to * * * units in 1980 and 1981, valued at approximately * * * and * * *, respectively (table 62).

Table 62.--Heavy electrical equipment: U.S. producers' exports by types, 1977-81

Year	Power circuit breakers			Power transformers		
	Units	Average rating	Value	Units	Average rating	Value
		KV	1,000 dollars		kVA	1,000 dollars
1977	11	242	***	62	43,192	***
1978	6	242	***	41	34,224	***
1979	33	242	***	42	48,783	***
1980	10	242	***	67	115,724	***
1981	10	242	***	74	145,104	***
	Steam turbine generator units			Gas turbine generator units		
	Units	Average rating	Value	Units	Average rating	Value
		MW	1,000 dollars		MW	1,000 dollars
1977	10	144	***	136	26	***
1978	7	416	***	91	28	***
1979	5	713	***	94	38	***
1980	20	177	***	121	47	***
1981	13	254	***	79	35	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Power transformers.--Exports of power transformers declined from * * * units, valued at * * *, in 1977 to * * * units, valued at * * * million, in 1978, and then increased annually to * * * units, valued at * * * million, in 1981. The average rating of these units followed the same trend as that for quantity and value, increasing from 43.2 mVA per unit in 1977 to 145.1 mVA per unit in 1981.

Steam turbine generator units.--U.S. exports of this equipment declined from * * * units in 1977 to * * * units in 1979; however, due to an increase in the average megawatt rating of these units from 144 MW in 1977 to 713 MW in 1979, the total value of shipments increased from * * * million in 1977 to * * * million in 1978 before declining to * * * million in 1979. A threefold increase in unit shipments in 1980 to * * * units pushed the total value in 1980 to * * * million despite a decline in the average unit rating to 177 MW. In 1981, the quantity of shipments declined to * * * units, but an increase in the average rating of units to 254 MW held the decline in total value of shipments to * * * percent, or * * * million.

Gas turbine generator units.--U.S. producers' export shipments of this equipment declined from 136 units, valued at * * * million, in 1977 to * * * units, valued at * * * million, in 1978, and then increased to * * * units, valued at * * * million, in 1980. In 1981, shipments declined to * * * units, valued at * * * million. The average megawatt rating of units during the period increased from 26 MW in 1977 to 47 MW in 1980 before declining to 35 MW in 1981.

The Current U.S. Market

Description of U.S. market

The principal U.S. purchasers of heavy electrical equipment, as previously mentioned, are public and investor-owned electric utilities and electric cooperatives, totaling in excess of 200 entities. However, approximately 80 of these utilities are responsible for about 95 percent of total U.S. purchases.

Since 1973, many U.S. utilities have experienced increasing pressure on their profitability as the result of almost an eightfold increase in the prices of fossil and nuclear fuel, the increased cost of which has only partially been passed on to consumers. 1/ As a result of these inflationary pressures and the substantially increased cost of financing the construction of new generating and transmission facilities, utilities have been taking a much harder look at long- and short-term purchases of equipment. Consequently, many purchases are either being deferred or canceled, and existing and proposed orders are being evaluated much more strenuously by utilities. These conditions have elevated the competitive pressures on U.S. producers which are dealing with increasingly more demanding customers and shrinking-production economies of scale associated with a declining U.S. market. In order to maintain minimal levels of production and thus avoid the idling of capital equipment, representatives of the major U.S. producers have indicated that they are being * * *.

The provisions of the Buy American Act have benefited U.S. producers of heavy electrical equipment to a limited extent, and then only with respect to business solicited by Federally operated power authorities. This act authorizes such utilities to purchase U.S.-produced equipment when the bids on such equipment are no more than 6 percent higher than bids by foreign suppliers. An additional 6-percent difference would be accorded a U.S. producer which manufactures the equipment in a designated "labor surplus" area. Such an area would be one in which the unemployment rate is above a specified level.

1/ Source: Standard and Poor's Industry Surveys: Utilities-Electric, Basic Analysis, July 2, 1981, p. U26.

Factors influencing market demand

The demand for heavy electrical equipment is largely determined by the increase in demand for electric power. Prior to the 1973 oil embargo, domestic demand for electric power increased about 7 to 8 percent each year. 1/ At present, with the high cost of energy, the use of electric power is increasing at an annual rate of only 2 to 3 percent. This shift in demand for power has resulted in utilities delaying or scheduling procurements over a longer period of time. Even with delayed procurements, the utilities are also facing certain market conditions which tend to exacerbate the shift in demand for heavy electrical equipment. With the high cost of utility bonds and the reluctance of State utility commissions to grant large rate increases, utilities are increasingly seeking ways to reduce future procurements. The major emphasis by the utilities is being placed on load management.

Under load management, utilities have concentrated their efforts in three areas, all of which have had a negative effect on U.S. heavy electrical equipment producers. First, a number of U.S. utilities have changed their policies with respect to their generating capacity margins. Utilities have historically maintained a capacity margin of about 25 percent above their peak loading requirements. Capacity margins are currently being reduced by certain U.S. utilities to around 15 percent above peak requirements. Second, a number of U.S. utilities are also considering the cost effectiveness of buying excess power through an interconnecting grid from other utilities rather than purchasing equipment and generating their own power. This intergrid loading tends to equalize capacity margins to all utilities connected to the grid. Finally, utilities are beginning to charge differential prices for power depending on the time of the day the power is used. Power used during peak-load hours is priced at a higher rate than power used during other hours of the day. The higher cost of power used during peak loads is serving to shift the demand for power by consumers from peak load periods of demand to off peak hours. All of these factors have tended to delay the purchase by utilities of new equipment.

1/ Testimony of Mr. Claude E. Hobbs (Westinghouse Electric Co.) on behalf of National Electrical Manufacturers Association, in Inv. No. 332-144 on Sept. 28, 1982. Transcript of the hearing, p. 197.

Factors of Competition in the Market

U.S. producers of heavy electrical equipment were asked in Commission questionnaires to indicate their firms' current competitive position with respect to major foreign competitors in the U.S. market. The responses received in the questionnaires indicate that U.S. producers and foreign producers each have certain advantages and disadvantages.

Raw materials

U.S. producers generally agree that domestic and foreign producers alike have no real advantage over each other in obtaining raw materials at competitive prices. Materials such as silicon steel and copper wire and components such as castings and forgings are priced competitively among all industrial countries. U.S. producers are able to secure these materials or components among various domestic suppliers, or in certain instances, are able to produce the articles in their vertically integrated facilities.

Labor costs

General agreement exists among U.S. producers that the cost of labor to produce heavy electrical equipment in the United States is lower than in Western Europe and higher than in Japan. The major U.S. producer reported that any labor rate disadvantages faced by U.S. producers are at least offset by higher U.S. productivity. The producer believes that as a result of the higher productivity, the U.S. industry may have an overall labor cost advantage over all foreign producers.

Capital formation

U.S. producers reported that foreign producers have a decided advantage in the area of capital formation. U.S. producers believe that liberalized accounting rules, hidden/untaxed reserves, deferred taxes, and opportunities for investment of pension funds by business in foreign countries all tend to serve as disadvantages to U.S. firms. In addition, the largest U.S. producer reported that foreign government subsidies, including economic risk guarantees and low-cost financing, serve as further disadvantages to U.S. producers.

Product technology

U.S. producers reported that they are the technological leaders in the heavy electrical industry. Statistics published on reliability and efficiency of U.S. heavy electrical equipment by the Federal Energy Regulatory Commission, the Nuclear Regulatory Commission, and the North American Reliability Council are cited by U.S. producers as evidence of U.S. superiority in technology. Further, U.S. producers have license agreements

with a number of foreign producers around the world that depend on U.S. technology.

Other factors

U.S. producers reported that the major advantage of foreign producers is related to their own markets. Foreign producers, they claim, operate from protected home markets that are often nationalized utilities which buy only from local producers. Further, foreign governments which are interested in maintaining employment give positive support to promoting exports. U.S. producers believe that these practices, along with the forgiveness of value-added taxes and the application of border taxes by foreign governments, serve to put U.S. firms at a severe disadvantage.

Foreign Export Credit Subsidies and Their Impact on the U.S. Industry

During the course of the investigation, the Commission staff did not discover an instance in which export credit financing was used to purchase an article of heavy electrical equipment. An instance did occur in 1981, however, in which an investor utility in New Jersey began preliminary discussions with European producers involving the construction of a coal-fired 300 MW steam, electricity-generating plant. Although the construction of the generating plant was subsequently postponed, discussions reported between officials of the utility and the European producers demonstrate the role that export credit financing can play in putting domestic producers at a disadvantage.

During June 1981, the Atlantic City Electric Co. (Atlantic City) was approached by Cogenel, Inc., a susidiary of Compagnie General De Electricite (France), concerning the construction of the proposed plant. A number of preliminary proposals were reportedly made by the French firm to the utility, including a proposal which would have covered the financing of the entire construction of the plant. During that time, the utility was also approached by the Swiss firm Brown-Boveri, which reportedly told officials of the utility of its interest in the project and its willingness to meet the terms and conditions offered by Cogenel. The utility reportedly showed particular interest in the foreign proposals, since it could have gained access to foreign capital at interest rates ranging between 7 and 9.6 percent per annum.

In the November 1981 issue of Electric Light and Power, the president of Atlantic City was quoted as saying that the utility could reduce the projected $550 million cost of constructing the power plant by $100 million by using foreign suppliers which have access to low-interest rate loans through European banks. These views were expanded on by the vice president of the utility in an interview with an Atlantic City newspaper on November 6, 1981,

in which he stated that, "the use of foreign equipment and financing is not an offer we can afford to dismiss out-of-hand simply because it's not American equipment." 1/ In the article, this official also reported that his firm would have to pay foreign investors about 9.5-percent interest to finance the project compared with 17 percent in the United States. The accuracy of the press reports were verified by the Commission staff in discussions with officials of Atlantic City.

At the time discussions took place between the utility and the European producers, the rate of interest in effect as sanctioned by the OECD agreement on export credit financing with respect to relatively rich countries was 8.5 percent for loans covering 2 to 5 years and 8.75 percent on loans covering 5 to 8 years. These rates covered the period between July 1, 1980, and November 1, 1981. After November 1, 1981, these rates were raised under the agreement to 11.0 percent and 11.25 percent, respectively, and remained in effect until July 6, 1982. After that date, the rates were raised again under the agreement to 12.15 percent and 12.4 percent.

If the 9.5-percent rate of interest referred to in the newspaper article by the vice president of Atlantic City had been contractually agreed to by the European producers after Nov. 1, 1981, and if that financing had involved an agency of the producer's government, these offers would have violated the OECD agreement. In any event, the rates of interest which were being discussed at the time of the preliminary talks were substantially below the average rate of interest charged on high-grade utility bonds during the period. Although the construction of the power plant was delayed, the Atlantic City Electric case clearly demonstrates how conditions of competition can change in the U.S. market when rates for export credit financing are below U.S. utility bond rates.

The financing of heavy electrical equipment purchases

Domestic sales of heavy electrical equipment have been rarely financed by other than the public and investor utilities which purchase the equipment. This has been true whether the equipment was purchased from domestic or foreign producers. Since 1978, however, due to a significant rise in interest rates on high-grade utility bonds, increased attention has been focused on financing offered by importers. In the future, the importance of this type of financing will depend on how utility bond rates behave and whether foreign export credit agencies will adhere to the OECD arrangement on export credit financing.

Sources of financing.--According to the 28 utilities responding to Commission questionnaires, purchases of heavy electrical equipment are financed by utilities through retained earnings, bank loans, and the issuance of equity and bonds (table 63). Reportedly, purchases were rarely financed by

1/ The Press, Atlantic City, N.J., Nov. 6, 1981, p. 22.

the producer or through loan guarantees of foreign governments. Loan guarantees from Federal, State, and local governments, however, were used by these utilities during 1977-81 (table 64).

Table 63.--Heavy electrical equipment: Sources of financing, 1977-81 1/

Source	1977	1978	1979	1980	1981
Banks	7	7	8	7	8
Sellers	1	0	1	0	1
Insurance companies	0	0	0	0	0
Leasing 2/	0	0	0	0	0
Retained earnings	9	7	8	7	8
Other, including the issuing of securities	11	11	13	12	10

1/ Some purchasers identified more than 1 source of financing in each year.
2/ Includes lease-purchase agreements.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 64.--Heavy electrical equipment: Sources of loan guarantees, 1977-81 1/

Source	1977	1978	1979	1980	1981
Sellers	0	0	0	0	0
U.S. Government 2/	3	3	3	3	3
Foreign governments	0	0	0	0	0
Other	2	2	2	2	2

1/ Purchasers were permitted to identify more than 1 source.
2/ Includes State and local governments.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Interest rates.--Investor utilities are considered creditworthy borrowers, and prior to 1977, a low rate of interest was paid on their bonds. Although the creditworthiness has remained, the interest rates on high-grade utility bonds since that date have shown a significant increase, rising from 8.19 percent in 1977 to 15.61 percent in July 1982, or by over 90 percent (table 65). The current utility bond rate is near the prime rate (the rate banks charge their best creditworthy customers), which also has shown a substantial increase since 1977.

Table 65.--Average interest rates on new issues of high-grade utility bonds, 1977-81, January 1982, and July 1982

(In percent)

Period	Interest rates
1977	8.19
1978	8.96
1979	10.03
1980	12.74
1981	15.56
1982:	
January	15.68
July	15.61

Source: U.S. Federal Reserve Board, Federal Reserve Bulletin, various issues.

With respect to retained earnings, although an explicit rate of interest is not applied when this type of financing is used, the utility forgoes the opportunity to retire outstanding debt. Therefore, the opportunity cost of financing purchases with retained earnings is the interest rate on its existing debt.

Financing of imports.--According to questionnaire responses, heavy electrical equipment has not been purchased by domestic utilities because of favorable financial terms of sale. A * * * firm was reported as the low bidder on a contract because of an offer of favorable financing, but * * *, the project was canceled. In at least two other cases, discussions took place between importers and utilities over favorable financing, but no contract was awarded. 1/ Favorable financing, however, is frequently offered by foreign producers of heavy electrical equipment on exports to countries other than the United States. 2/

*　　*　　*　　*　　*　　*　　*

1/ Case discussed in introduction of this section.

2/ See testimony of Herman R. Hill, Executive Vice President, The General Co., Oct. 1, 1982.

*   *   *   *   *   *   *

Table 66.--Heavy electrical equipment: A comparison of bids

Item	Foreign bid	U.S. bid	Margin of underselling	
			Value	Share
	1,000 dollars			Percent
* * *:				
* * *	***	***	***	***
* * * 1/	***	***	***	***
* * *:				
* * *	***	***	***	***
* * *	***	***	***	***

1/ * * *.

Source: Compiled from data submitted in response to a questionnaire of the U.S. International Trade Commission.

The effects of export credits in the future can be shown by a present-value analysis of various contracts using different market interest rates. The results of such an analysis are in table 67. An example in the table shows how different financing terms affect the cost of purchasing equipment valued at $55 million, the cost of a large project. One producer offers terms allowed under the OECD arrangement, a 12.4-percent interest rate for a term of 8 years. The other two producers offer terms similar to those discussed with U.S. purchasers of heavy electrical equipment, 10-year contracts at interest rates of 9.5 and 10.75 percent. 1/ Present values are calulated at assumed market interest rates of 14, 15, and 16 percent. The first two rates are slightly below the current interest rate on high-grade utility bonds; the third is slightly above this interest rate.

1/ These contracts all call for equal semiannual payments with downpayments of 15 percent made on delivery and the first payment made several months later.

The data in table 67 show the importance of OECD arrangements and market interest rates to the future of export credits. Assuming a 14-percent market interest rate, the financing terms allowed under the arrangement lower costs by only by 4.4 percent; Nonarrangement terms lower costs by 10.4 and 14.3 percent. Changes in market interest rates can also affect the value of export credits. An increase in the market interest rate from 14 to 16 percent will more than double the effect of arrangement terms on costs. At a 16-percent interest rate, costs are reduced by 9.5 percent by these financing terms.

Sales experience of the U.S. industry, January 1977-September 1982

Commission questionnaires were mailed to 43 domestic utilities believed to be the largest purchasers of heavy electrical equipment from foreign producers. Responses were received from 28 of these utilities, including certain public utilities which are subject to the provisions of the Buy American Act. In the questionnaires, each utility was requested to provide the Commission with a list of contracts for heavy electrical equipment awarded to foreign and domestic producers during January 1977-September 1982. Further, each utility was requested to provide the Commission with the principal reasons why awards were made particularly with respect to financial terms of sale. The Commission also requested that each utility provide the quantity and value of heavy electrical equipment received during 1977-81.

Power circuit breakers.--During the period under consideration, the 28 utilities responding to Commission questionnaires reported that 65 contracts were awarded to foreign and domestic producers for a total of 228 circuit breakers. Of these contracts, 48 were awarded to foreign producers, and 17 were awarded to domestic producers. The contracts awarded to domestic producers covered a total of 63 circuit breakers, or about 28 percent of the units for which contracts were made.

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Table 67.--Heavy electrical equipment: Effects of financing on the cost of purchasing 55 million dollars' worth of equipment 1/

Terms	Actual interest rate	Assumed interest rates length	14 percent Present value	14 percent Savings		15 percent Present value	15 percent Savings		16 percent Present value	16 percent Savings	
	Percent	Years	---1,000 dollars---		Percent	---1,000 dollars--		Percent	---1,000 dollars---		Percent
Arrangement	12.4	8	52,553	2,447	4.4	51,122	3,878	7.1	49,761	5,239	9.5
Nonarrangement	10.8	10	49,265	5,735	10.4	47,718	7,282	13.2	46,261	8,739	15.9
Nonarrangement	9.5	10	47,154	7,846	14.3	45,687	9,313	16.9	44,305	10,695	19.4

1/ Percentages are calculated using unrounded figures.

Source: Estimated by the staff of the U.S. International Trade Commission.

The value of the contracts awarded during the period showed a significant decline, from $16.7 million in 1977 to $6.7 million in 1981. During January-September 1981, contracts awarded by the utilities were valued at only $1.3 million. The 60-percent reduction in orders placed by these utilities during 1977-81 reflects the continued slow growth in demand for electric power in the United States. The reduction in orders, however, more severely affected domestic producers than foreign producers, since all the contracts placed by these utilities during 1981 and January-September 1982 were awarded to foreign producers, as shown in table 68.

Table 68.--Power circuit breakers: Value of contracts awarded to domestic and foreign producers, 1977-81 and January-September 1982

(In thousands of dollars)

Producer	1977	1978	1979	1980	1981	Jan.-Sept. 1982
Domestic---	9,203.7	1,742.4	133.8	2,883.9	-	-
Foreign----	7,512.8	11,952.7	6,846.2	3,631.0	6,746.0	1,266.0
Total--	16,716.5	13,695.1	6,980.0	6,514.9	6,746.0	1,266.0

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Of the 65 contract awards, 56 were awarded by utilities on the basis of nominal price after due consideration was given to technical competence. The remaining contracts were largely awarded after consideration was given to material and labor-escalation factors, delivery schedules, and warranty and service requirements. A few contracts were awarded for spare units or failed units to the producer of the original breaker in the interest of maintaining the general arrangement of the equipment in the power station. In no instance did any of the 28 utilities report that a contract was awarded to either a domestic or foreign producer on the basis of financial terms of sale. An index of the 65 contracts awarded during 1977-81 and January-September 1982 is found in appendix H.

In addition to a list of contract awards, each utility was requested to rank in order of importance the purchasing criteria used in placing a contract for a circuit breaker. The responses received are consistent with information supplied on each contract awarded during the period under consideration, as shown in table 69.

Table 69.--Weighted ranking of selected criteria in the purchasing of power circuit breakers

Ranking 1/	Criteria	Number of purchasers selecting criteria		
		Most important	2d most important	3d most important
1	Price	11	3	2
2	Quality	2	6	4
3	Delivery	0	2	6
4	Efficiency	1	5	1
5	Technical and service support	1	4	2
6	Availability	0	0	4
7	Options	4	4	0
8	Financial package	0	1	0
9	Other	1	4	0

1/ Overall ranking based on the questionnaire responses of U.S. utility customers.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The value of power circuit breakers delivered to the 28 utilities during 1977-81 was larger than the value of circuit breakers placed under contract. Deliveries were valued at $88 million during the period compared with $52 million in circuit breaker awards. Foreign producers accounted for about 45 percent of the value of deliveries compared with 55 percent for domestic producers. Foreign producers, however, increased their share of deliveries during the end of the period, accounting for more of the delivered valued during 1980 and 1981. A period of 1 to 2 years is required for the delivery of a circuit breaker after an award is made. Table 70 is an aggregation of the responses received from the 28 utilities, showing deliveries during 1977-81 and including the average power rating of the devices.

Table 70.--Power circuit breakers: Deliveries received from domestic and foreign producers, 1977-81

Source and item	1977	1978	1979	1980	1981
Domestic:					
Quantity------------------units--:	55	76	96	91	40
Average rating--------------KV--:	280	280	260	260	240
Foreign:					
Quantity------------------units--:	28	16	22	68	43
Average rating--------------KV--:	570	500	350	410	330
Total----------------------units--:	83	92	118	159	83
Domestic-----------1,000 dollars--:	7,765	13,232	12,454	11,606	2,891
Foreign---------------------do----:	7,997	4,794	3,455	15,120	9,086
Total-------------------do----:	15,762	18,026	15,909	26,726	11,977

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Power transformers.--A total of 189 contracts for power transformers were awarded by the 28 utilities during 1977-81 and January-September 1982. Of these contracts, 127 were awarded to domestic producers, and 62 were awarded to foreign producers. The contracts awarded to domestic producers covered a total of 271 power transformers, or about 65 percent of the total units on which contracts were placed. Contract awards, both to domestic and foreign producers, reached a peak in 1978, when 52 contracts were placed for a total of 135 units. Compared with the peak in 1978, contracts placed during January-September 1982 were down to five awards covering a total of six units.

Large fluctuations in the value of the contracts were shown in the awards made by the utilities during 1977-81. In 1977, contracts placed that year were valued at $23 million, increasing to $106 million in 1978, and then decreasing to $28 million in 1980. During January-September 1982, contracts placed by the utilities were valued at only $3 million.

During the period under consideration, domestic producers accounted for about 62 percent of the total value of the awards made by the utilities. The share of the contract value accounted for by domestic producers was consistently above 60 percent each year during the period except in 1979. The value of awards made by the utilities is shown table 71.

Table 71.--Power transformers: Value of contracts awarded to domestic and foreign producers, 1977-81 and January-September 1982

(In thousands of dollars)

Producer	1977	1978	1979	1980	1981	Jan.-Sept. 1982
Domestic	7,346.4	41,551.1	16,724.2	8,611.6	21,488.9	1,168.0
Foreign	15,401.3	64,287.4	14,197.8	19,275.4	40,927.1	1,785.4
Total	22,747.7	105,838.5	30,922.0	27,887.0	62,416.0	2,943.4

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

In making an award for a power transformer, strong consideration is usually given by the utility to the efficiency of the unit. The efficiency of a transformer is a measure of the power losses sustained when the unit is under a load. The losses across the unit can be measured in watts and converted to a value. With a transformer life expectancy of 30 years or more, these power losses can be substantial over time. The losses over time are called life-cycle costs, which are used by the utility along with other considerations in evaluating a producer's offered price.

In spite of the consideration given to the efficiency of transformers purchased by the 28 utilities, a large share of the 189 contracts both to domestic and foreign producers were awarded on the basis of nominal price. Like awards made for power circuit breakers, consideration was also given in certain instances for material and labor escalation factors, delivery schedules, and warranty and service requirements. Further, like circuit breakers for failed units, a few contracts were awarded to the original producer in order to avoid the rearrangement of the power station to accommodate the design of a different producer. Also, like circuit breakers, in no case did a utility report that a transformer contract was awarded on the basis of financial terms of sale. An index of the 189 contracts awarded for the period under consideration is found in app. H.

The role that efficiency plays in determining whether a contract is awarded is also shown by the responses received from the utilities. When asked to rank, in order of importance, the criteria used in placing an order for a power transformer, efficiency was ranked next to price and substantially above other considerations. Responses received from the utilities on purchasing criteria are shown in table 72.

Table. 72--Weighted ranking of selected criteria in the purchasing of power transformers

Ranking 1/	Criteria	Number of purchasers selecting criteria: Most important	2d most important	3d most important
1	Price	14	2	2
2	Efficiency	1	14	3
3	Delivery	0	2	6
4	Quality	2	3	7
5	Technical and service support	1	4	1
6	Availability	0	0	3
7	Options	4	4	0
8	Financial package	0	0	1
9	Other	4	4	0

1/ Overall ranking, based on the questionnaire responses of U.S. utility customers.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Less fluctuation was shown in the value of transformers delivered to the 28 utilities during 1977-81 than in contract awards. During the period, deliveries increased irregularly from 159 units, valued at $57 million, in 1977 to 220 units, valued at $81 million, in 1981. Although domestic producers accounted for a large share of deliveries, foreign producers increased their share of delivered value from 9 percent in 1977 to 38 percent in 1980. Deliveries made to the utilities during 1977-81, along with the average power rating of the devices, are shown in table 73.

Table 73.--Power transformers: Deliveries received from domestic and foreign producers, 1977-81

Item	1977	1978	1979	1980	1981
Domestic:					
Quantity--------units--	139	160	219	188	150
Average rating--------mVA--	87	70	114	158	97
Foreign:					
Quantity--------units--	20	15	13	41	70
Average rating--------mVA--	24	117	121	47	70
Total--------units--	159	175	232	229	220
Domestic--------1,000 dollars--	51,525	59,134	73,040	60,466	50,534
Foreign--------do----	5,290	9,507	6,744	11,922	30,594
Total--------do----	56,815	68,641	79,784	72,388	81,128

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Steam turbine generator units.--Only 5 contract awards covering 5 units were made for steam turbine generator units by the 28 utilities during 1977-81. Three of the contracts were awarded to foreign producers, and two were awarded to domestic producers. In terms of value, a single contract awarded to a foreign producer in 1978 accounted for a large share of total awards during the period. The foreign contract award was valued at $89 million and was nine times larger than the value of all other awards made during the period, as shown in table 74.

Table 74.--Steam, turbine generator units: Value of contracts awarded to domestic and foreign producers, 1977-82 1/

(In thousands of dollars)

Producer	1978	1980	1981
Domestic	-	1,574	2,946
Foreign	88,553	2,010	-
Total	88,553	3,584	2,946

1/ No contracts were awarded in 1977, 1979, and January-September 1982.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Although a limited number of contracts were awarded for steam turbine generator units during 1977-81, responses received from the other utilities with respect to the criteria they would use to award a contract showed that price, efficiency, and quality would play the principal role in their decisions. These responses are consistent with the criteria used in awarding the five contracts during the period. Three of those contracts were awarded on the basis of nominal price, and two were awarded on the basis of delivery or an evaluation of the installation factors affecting the power station. No contract was awarded on the basis of financial terms of sale. An index of the contracts for steam turbine generator units is found in app. H, and the responses received with respect to purchasing criteria are shown in table 75.

Table. 75--Weighted ranking of selected criteria in the purchasing of steam turbine generator units

Ranking 1/	Criteria	Number of purchasers selecting criteria		
		Most important	2d most important	3d most important
1	Price	4	3	1
2	Efficiency	4	5	1
3	Delivery	2	1	0
4	Technical and service support	0	0	2
5	Quality	3	1	6
6	Availability	0	0	1
7	Financial package	1	0	1
8	Options	0	0	0
9	Other	1	4	0

1/ Overall ranking, based on the questionnaire responses of U.S. utility customers.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

During 1977-81, 42 steam turbine generator units were delivered to the 28 utilities with a combined value of more than $900 million. Foreign producers accounted for 22 units and 51 percent of the delivered value, and domestic producers accounted for 20 units and 49 percent of the delivered value. As shown in table 76, 1978 was the year with the largest contract deliveries. In that year, the utilities reported they received 14 steam turbine generator units, valued in excess of $323 million.

Table 76.--Steam turbine generator units: Deliveries received from domestic and foreign producers, 1977-81

Item	1977	1978	1979	1980	1981
Domestic:					
Quantity------------------units--:	2	8	2	5	3
Average rating--------------mVA--:	890	670	780	690	450
Foreign:					
Quantity------------------units--:	2	6	5	4	5
Average rating--------------mVA--:	560	950	970	840	430
Total units-----------------units--:	4	14	7	9	8
Domestic------------1,00 dollars--:	44,565	155,186	35,060	143,453	63,230
Foreign---------------------do----:	24,469	168,457	141,922	70,096	56,766
Total-------------------do----:	69,034	323,643	176,982	213,549	119,996

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Gas turbine generator units.--The 28 utilities reported that during 1977-81, no awards were made for gas turbine generator units. Although their responses were limited, the utilities also reported that price, efficiency, and delivery were the principal considerations they would use in entering a contract for such articles.

Only eight gas turbine generator units were received by the utilities during 1977-81 for a combined value of $56 million. No deliveries were received in 1979 or 1980, and no deliveries were received from foreign producers. The largest deliveries occurred in 1978, when five units, valued at $31 million, were received, as shown in table 77.

Table 77.--Gas turbine generator units: Deliveries received from domestic sources, 1977-81

Item	1977	1978	1979	1980	1981
Quantity-------------------units--:	2	5	0	0	1
Average rating---------------mVA--:	60	50	0	0	90
Value--------------1,000 dollars--:	14,767	31,459	0	0	9,485

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Likely Future Trends in the U.S. Market

The depressed condition of the U.S. heavy electrical equipment market is not expected to improve significantly during the next 5 years. With electric

power consumption experiencing a low growth rate and with utility generating reserve margins expected to remain high in the near term, less generation and distribution equipment will thus be required by purchasers. In a supplemental response submitted by * * * producer of turbine generator units, the firm estimated that the entire industry would receive * * * new domestic orders for steam turbine generator units during 1982-86. The combined power rating of these units was expected to total * * * . By applying a general industry value "rule of thumb" estimate of approximately $120,000 per megawatt, projected annual orders received by the industry would thus average approximately * * * during 1982-86. However, the company is projecting the receipt of * * * industry orders in 1982 and only * * * orders through 1984. Demand is then estimated to increase to * * * units, rated at * * * megawatts, in 1985 and * * * units, rated at * * * megawatts, in 1986. The U.S. industry, therefore, is expected to depend to an increasing extent on * * * for steam turbine generator units in order to maintain historical production levels.

The U.S. market for power transformers is at its lowest level in nearly 20 years. U.S. industry sources currently project an average annual domestic demand for power transformers of only * * * mVA during 1982-86. U.S. shipments of power transformers during the same period are estimated to average only * * * mVA per year.

Little is currently known about projected U.S. power circuit breaker demand; however, although yearly demand for this equipment is somewhat independent of that for power transformers and steam turbine generator units, the long-term trend for orders and shipments of power circuit breakers is expected to track that for these other equipment categories. Further, although U.S. contract awards for gas turbine generator units have steadily increased since 1978, foreign markets currently represent the area of greatest growth potential in demand during 1982-86. In addition, U.S. producers are anticipating increased international competition, particularly from Japanese producers, in the expanding market. U.S. producers indicated that foreign export credit subsidies provided by foreign governments were much more a factor in international markets than in the United States.

Based on 1981 production-employment relationships, each $100 million in production of heavy electrical equipment not undertaken by U.S. firms because of foreign competition translates into an estimated $222 million in lost production opportunities in all sectors of the U.S. economy and approximately 3,050 jobs not created. 1/ In the heavy electrical equipment sector alone, about $102 million in potential production is lost, along with approximately 1,540 jobs. The estimated effects on the entire U.S. economy, assuming $100 million of lost production opportunities, is summarized in the table 78.

1/ These estimates are based on the Bureau of Labor Statistics (BLS) input-output model. In the BLS model, certain components of heavy electrical equipment are double counted; therefore, the "output lost" data are overstated.

Table 78.--Heavy electrical equipment: Effects of $100 million in lost production opportunities of heavy electrical equipment on U.S. industries' output and employment, 1981

Industry sector	Employment lost	Output lost
	Number of employees	Million dollars
Heavy electrical equipment	1,537	101.8
Other manufacturing	808	85.9
Other	701	34.3
Total	3,046	222.0

SELF-PROPELLED RAILCARS

The Structure of the U.S. Industry and that of Major Foreign Competitors

Product description 1/

Rail passenger cars are self-propelled or non-self-propelled vehicles used for urban, suburban, or intercity transport of passengers. These rail vehicles may be broadly divided into the following categories: rapid-transit cars, light rail vehicles (LRV's), commuter or suburban cars, and intercity cars. Although such vehicles vary somewhat in passenger-seating capacity, interior and exterior finishings, and speed at which they are normally operated, all are of similar design and may be assembled from parts and equipment which are essentially alike and utilizing the same employees. Because of these manufacturing conditions, data on all types of rail passenger cars will be given in this report. However, the design and production engineering for self-propelled rail vehicles is considerably more complicated than that for non-self-propelled vehicles.

A great majority of rail passenger cars are built to design specifications set by local officials to meet the needs of their unique transit systems. Thus, each procurement of passenger cars differs significantly from the next. Although the normal useful life of a rail passenger car is about 20 years, this varies, as shown by New York's projection of a 35-year useful life for the R-62 rapid-transit car.

Rapid-transit cars are passenger vehicles which are used in subways or elevated rail systems, or grade-separated near the ground level. Generally, these cars are electrically propelled and are operated within a city or between a city and its neighboring suburbs. Rapid-transit systems are intended to provide local transport of passengers and are characterized by a great number of stops. Such cars are usually joined together to form trains; the number of cars used per train varies somewhat from one system to another. Passenger-load requirements, subway station platform sizes, and strength of local elevated structures are important influencing factors in determining the number of cars to be used in a train. Although rapid-transit cars are normally coupled together, most are capable of self-propulsion. Some rapid-transit cars, which are referred to in the industry as married units, consist of an "A" and a "B" car, neither of which is capable of self-propulsion, but when coupled together into units, they are self-propelled. The industry and customs consider these "A" and "B" cars to be self-propelled, since the cars would normally be sold together in married units. Rapid-transit cars, as well as LRV's, may be single-end (capable of propulsion in one direction only) or double-end (capable of propulsion in two directions).

1/ The information in this section closely parallels that contained in an earlier Commission report, Rail Passenger Cars and Parts Thereof Intended for Use as Original Equipment in the United States from Italy and Japan: Determinations of No Injury or Likelihood Thereof in Investigations Nos. 731-TA-5 and 6 (Preliminary) . . ., USITC Publication 1034, February 1980, p. A-2.

LRV's are passenger cars used as streetcars or trolleys. Such vehicles are guided along tracks at ground level, but are propelled electrically by wires running overhead or beneath a slot between the tracks. The use of LRV's in the United States was nearly eliminated during the 1960's. However, since the early 1970's, there has been renewed interest in the development of streetcar systems in the United States. With the price and availability of gasoline uncertain and with Federal funds eliminated for new subway system starts, the development of cheaper LRV systems for intracity passenger transport in the United States can be expected to rise.

Commuter or suburban and intercity cars may be designed to be either self-propelled or hauled by a locomotive. Generally, suburban cars are used within a 50-mile radius of a city; intercity cars transport passengers between major cities. In addition, both commuter and intercity cars must meet significantly more stringent crash standards because of the greater speeds which they attain. Commuter systems currently are operated in 11 of the top 20 standard metropolitan statistical areas in the continental United States and include New York City, Los Angeles, Chicago, Philadelphia, Detroit, San Francisco, Washington, D.C., Boston, Pittsburgh, Baltimore, and San Diego. 1/ Commuter and intercity cars may be propelled electrically or by diesel-electric engines. 2/

Major components or parts of rail passenger vehicles include the shell (generally includes a floor, sides, top, ends, and underframe, and some wiring), truck assembly parts (truck castings (including the bolster), wheels, and axles), brakes, propulsion systems, couplers, air conditioning systems, and seats. The truck assembly supports the rail car. Couplers connect the rail cars physically as well as connecting the electrical and pneumatic systems. Frequently, some of these parts are imported rather than the finished rail passenger car.

U.S. industry 3/

The only remaining U.S.-based firm seeking prime contracts to build rail passenger vehicles is the Budd Co. (Budd) of Troy, Mich. Budd was purchased in April 1978 by Thyssen AG, Duisburg, West Germany, which now owns all its stock; Budd is no longer a publicly held firm. Thyssen's major line of business is steel, but it is also involved in mining, electronics, and transportation. According to officials of Budd, the firm operates independent

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1/ The Railway Progress Institute, U.S. Public Transportation Program: Toward a Balanced System, October 1982, p. III-4.

2/ Internal-combustion engine with electric transmission.

3/ This section also draws significantly on, Rail Passenger Cars and Parts Thereof . . ., USITC Publication 1034, February 1980, pp. A-13 and A-14, and Certain Rail Passenger Cars and Parts Thereof from Canada: Determination of the Commission in Investigation No. 701-TA-182 (Preliminary) . . ., USITC Publication 1277, August 1982, pp. A-3 and A-5.

of Thyssen in business operations and utilizes American management and production employees. The firm must answer only on profits. A discussion of Budd is presented in appendix I.

In 1976, five U.S. firms were engaged in bidding for prime contracts to build rail passenger cars: The Rohr Corp., Chula Vista, Calif; General Electric (GE), Erie, Pa.; Boeing-Vertol Co., Division of Boeing Co., Philadelphia, Pa.; Pullman-Standard Co., Chicago, Ill.; and the Budd Co., Philadelphia, Pa., whose corporate headquarters is in Troy, Mich. During 1976-79, four of the five firms producing rail passenger cars in the United States announced that they would cease bidding on future contracts as primary contractors, leaving only Budd still bidding, as shown in the following tabulation:

Manufacturer	Date of announcement to cease bidding
The Rohr Corp------------------------	1976
General Electric---------------------	Summer of 1978
Boeing-Vertol Co---------------------	November 1978
Pullman-Standard Co------------------	March 1979

However, following the acquisition of Pullman and its engineering company, M.W. Kellog, by Wheelabrator-Frye, Hampton, N.H., in November 1980, Pullman became involved in bidding for the contract to produce 1,150 R-62 rapid-transit cars for New York City. Pullman withdrew from the bidding process in early December 1981, and in July 1982 closed its rail passenger car division, including the sale of all assets and real estate and the laying off of all employees. Pullman's involvement in the bidding process and reasons for withdrawing will be discussed in greater detail in the case study section. See appendix J.

Following their announcements to cease bidding for future prime contracts, these four firms continued to produce rail passenger cars to fulfill outstanding contracts. According to reports in Railway Age, of these four, only General Electric has an original order still outstanding. 1/ Boeing-Vertol is currently retrofitting 40 LRV's, which it originally sold to Boston, for sale to the San Francisco Muni system. In addition, GE and Boeing-Vertol are performing final assembly work for several foreign firms 2/ so that they can meet the "Buy American" requirements of U.S. law. "Buy American" will be discussed in more detail later in this section. It should be noted that final assembly involves considerably less work than the assembly

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1/ Railway Age, Jan. 11, 1982, p. 15.

2/ GE is completing a subcontract with Breda of Italy for 48 LRV's for Cleveland; it will assemble 44 commuter cars for Nippon Sharyo of Japan for Chicago-Northern Indiana and 60 rapid-transit cars for Tokyu Car of Japan for Cleveland. Boeing is performing final assembly as a subcontractor for Kawasaki Heavy Industries of Japan, which is supplying Philadelphia (SEPTA) with 141 LRV's and 125 rapid-transit cars.

and related engineering work normally performed by a prime contractor and can be done by many shops with capabilities of working on rail passenger cars. Evidence of this are recent announcements that Amtrak will perform final assembly for Breda of Italy of rapid-transit cars for Washington, D.C., and Blaw-Knox Equipment Co., a division of White Consolidated Industries, Blawnox, Pa. (a suburb of Pittsburgh), will do the same for LRV's produced by Siemens-DuWag of West Germany for Pittsburgh. Blaw-Knox Equipment does not currently manufacture rail vehicles of any type or any components or parts for rail passenger vehicles.

It should also be noted that Bombardier, Inc., of America, Barre, Vt., a part of the Mass Transit Division of Bombardier, Inc., of Canada currently performs final assembly on contracts for rail passenger cars delivered in the United States. At this time, commuter cars for New Jersey Transit are being assembled there, and the LRV's for Portland and R-62 rapid-transit cars for New York will also undergo final assembly in Barre. Bombardier plans to expand its facilities in Barre to accomodate the large New York order.

In its February 1980 report, the Commission noted reasons given by car builders for ceasing bidding on future prime contracts. Recent discussions with officials in the industry suggest that, except for the inclusion of price-escalation clauses, most of these problems such as, financial losses on past contracts and the erratic nature of orders for the industry, still exist.

In addition, the procurement process itself was seen by the manufacturers as burdensome, being subject to competitive bidding and, from 1978 on, to "Buy American" provisions of U.S. law. The "Buy American" provisions require final assembly of rail passenger cars to be undertaken in the United States and at least 50 percent of the components to be of U.S. origin when Federal funds are used. The Commission discussed this process at length in its February 1980 report and, when competitive bidding and Federal funds are involved, the process has changed little. The following lists the steps in the "Buy American" process, whereas the negotiated bidding used by New York in procuring the R-62 rapid-transit cars will be discussed in the case study section (app. J).

1. The procurement of rail passenger cars by local or regional transit authorities generally begins with requests for funding submitted to the Urban Mass Transportation Authority (UMTA) of the Department of Transportation, and to State and local governments.

2. Preliminary specifications are issued by the transit authority to car builders to be reviewed for terms as well as technical requirements. The car builders may then offer comments for changes and/or clarifications of the specifications. After incorporating any changes that may be necessary, the final specifications are issued.

3. Advertisement for bids on a contract to produce rail passenger cars.

4. After the bids have been submitted, the lowest bidder is identified. In the event that the lowest bidder is found to be unqualified to build the proposed cars, the second lowest bidder would be evaluated.

5. As a result of the enactment of the "Buy American" provision that rail cars will contain at least 50 percent U.S. components and that final assembly will be in the United States, the purchasing authority selects the lowest responsive and responsible bidder, but the contract award is not final until approved by UMTA. 1/

U.S. shipments and undelivered backlog.--A rail passenger car is considered to be obtained from the United States for the purpose of this investigation if the prime contractor and car builder are both U.S. based and if most of the assembly operations occur in the United States. The following tabulation shows U.S. builders' deliveries of rail passenger cars, by types, during 1977-81: 2/

Type	Quantity	Percent of total
Rapid-transit-----------	694	39
Commuter----------------	497	28
Intercity---------------	409	23
Light rail--------------	178	10
Total---------------	1,778	100

Table 79 shows deliveries, by U.S. builders, types of cars, and purchasers, during 1977-81. Total deliveries dropped sharply from 803 in 1977 to 318 in 1978 and continued to decline to 150 in 1981 as builders left the industry. During this period, both Pullman-Standard and Budd supplied intercity, commuter, and rapid-transit cars. Boeing was the only supplier of LRV's and also supplied subway cars. Rohr supplied only rapid-transit cars, and General Electric, only commuter cars. Although more rapid-transit cars were delivered during 1977-81 than any other type of car, most of these were delivered by Pullman-Standard, Boeing-Vertol, and Rohr. Budd's deliveries consisted primarily of intercity cars and commuter cars. However, Pullman-Standard produced more intercity cars than Budd, and GE produced more commuter cars. Because of the batch nature of orders and the uneven

1/ Federal, State, and city laws require under competitive bidding that the lowest responsive (technologically) and responsible (financially) bidder receive the contract.

2/ Compiled from various issues of Railway Age.

Table 79.--Rail passenger cars: U.S. deliveries by domestic car builders, by types of cars and by purchasers, 1977-81

(In units)

Builder, type of car, and purchaser	1977	1978	1979	1980	1981
Pullman-Standard:					
Intercity (Amtrak)	0	1	61	134	83
Commuter (Boston (MBTA)	0	1	52	7	0
Rapid-transit (New York (MTA-NYCTA))	272	74	0	0	0
Total	272	76	113	141	83
Budd:					
Intercity (Amtrak)	113	0	0	0	17
Rapid-transit (Chicago (CTA))	0	0	0	0	14
Commuter:					
New York (MTA-Conrail)	0	0	0	0	10
Chicago (RTA)	0	71	15	55	0
Connecticut (CDOT)	0	0	0	13	0
Subtotal	0	71	15	68	10
Total	113	71	15	68	41
General Electric:					
Commuter:					
New Jersey (NJDOT-Conrail)	115	51	59	0	26
New York (MTA)	0	8	0	0	0
Philadelphia (SEPTA)	14	0	0	0	0
Total	129	59	59	0	26
Boeing-Vertol:					
Light rail:					
Boston (MBTA)	61	5	0	0	0
San Francisco (Muni)	0	11	71	30	0
Rapid-transit (Chicago (CTA))	100	96	10	0	0
Total	161	112	81	30	0
Rohr:					
Rapid-transit (Washington (WMATA))	128	0	0	0	0
Grand Total	803	318	268	239	150

Source: Compiled from various issues of Railway Age.

distribution of resulting annual deliveries by individual firms, total deliveries of rail passenger cars by each firm during 1977-81, as shown in the following tabulation, give a better idea of the role each had in the market: 1/

Firm	Quantity	Percent of total
Pullman-Standard--------	685	39
Boeing-Vertol-----------	384	22
Budd--------------------	308	17
General Electric--------	273	15
Rohr--------------------	128	7
Total---------------	1,778	100

There is a normal lag period of about 18 months to 2 years between the order and initial deliveries, depending on the type of car, complexity of the design, and production process. Thus, it should be noted that part of the explanation for the smaller number of deliveries by Budd is that it did not bid on contracts during 1974-76 because of losses suffered on several contracts in the early 1970's; the company reportedly considered leaving the rail passenger car business in the mid-1970's.

Currently, according to Railway Age, only Budd and GE have an undelivered backlog of orders for rail passenger vehicles (table 80). GE still has 33 commuter cars on order for New Jersey Transit. The following tabulation shows Budd's undelivered backlog, by types of cars, as of December 31, 1981:

Type	Quantity
Rapid-transit------------------------	794
Intercity----------------------------	134
Commuter-----------------------------	1/ 130
	1,058

1/ New York also exercised an option for an additional 186 commuter cars in April 1982, and Baltimore exercised an option for 28 subway cars in January 1982.

Thus, in April, Budd's total backlog was probably over 1,200 cars.

Since rail passenger cars are almost always produced for direct delivery, little or no inventory of finished cars is maintained.

1/ Compiled from various issues of Railway Age.

Table 80.--Undelivered backlog of rail passenger cars ordered from domestic and foreign producers, by purchasers, as of Dec. 31, 1981

Type, source, and purchaser	Quantity	Producer
Rapid-transit:		
Domestic:		
Baltimore (MDMTA)	72	Budd.
Chicago (CTA)	586	Budd.
Miami (MDCTA)	136	Budd.
Total	794	
Foreign:		
Atlanta (MARTA)	2	Franco-Belge (France).
Philadelphia (SEPTA)	123	Kawasaki (Japan).
Washington (WMATA)	296	Breda (Italy).
Total	421	
Total, rapid-transit	1,215	
Commuter:		
Domestic:		
New Jersey (NJDOT)	33	General Electric.
New York (MTA-Conrail)	60	Budd.
New York (MTA-LIRR)	70	Budd.
Total	163	
Foreign:		
Chicago-Northern Indiana (RTA-NITA-CSS & SB)	44	Sumitomo (Japan).
New Jersey (NJ Transit)	177	Bombardier (Canada).
Total	161	
Total, commuter	324	
Light rail:		
Domestic	0	
Foreign:		
Buffalo (NFTA)	33	Tokyu Car (Japan).
Cleveland (GCRTA)	28	Breda (Italy).
Philadelphia (SEPTA)	74	Kawasaki (Japan).
Portland (Tri-County MTD)	26	Bombardier (Canada).
San Diego (MTDB)	10	Siemans-DuWag (West Germany).
Total	171	
Intercity:		
Domestic:		
Amtrak	134	Budd.
Foreign:	0	
Total	134	
Grand total:		
Domestic	1,091	
Foreign	753	
Total	1,844	

Source: Railway Age, Jan. 11, 1982, p. 15.

Contract awards.--The table in appendix K shows all sales of rail passenger cars in the U.S. market between January 1977 and November 1982. Data in the following tabulation show the volume of contract awards, including options on awards, by types of rail passenger cars, to U.S. car builders during the same time period.

Type	1977	1978	1979	1980	1981	Jan.-Nov. 1982	Total
Commuter	177	35	47	0	130	186	575
Rapid-transit	0	300	208	0	300	28	836
Intercity	0	0	0	150	0	0	150
Light rail	0	0	0	0	0	0	0
Total	177	335	255	150	430	214	1,561

Source: Urban Mass Transportation Authority, Amtrak, various purchasers, the Budd Co., and various issues of Railway Age.

The total volume of rail passenger car contract awards, including options, to U.S. car builders during the entire period amounted to 1,561. This was 38 percent of the total contract awards for purchases of 4,149 cars. Out of the 1,561 cars, 53.6 percent were rapid-transit cars, 36.8 percent, commuter cars, and 9.6 percent, intercity cars. The amounts varied considerably from year to year because of the large batch nature of orders from a number of purchasers, ranging from a low of 150 cars in 1980 to a high of 430 cars in 1981. Out of all contracts obtained by domestic car builders during this period, all but three went to the Budd Co. GE obtained one contract for 50 commuter cars in 1977, and Pullman obtained two for a total of 60 commuter cars in 1977-78. Budd was awarded the remaining orders for 1,451 cars. The largest contract awarded to Budd involved 300 rapid-transit cars purchased by the Chicago Transit Authority (CTA) in December 1978. In October 1981, CTA exercised an option to purchase an additional 300 cars.

Capacity.--The capacity of U.S.-based prime contractors of rail passenger cars decreased from an estimated * * * cars in 1977 to * * * cars in 1981 (table 81). This happened because by 1981, all such contractors but the Budd Co. phased out their production operations. Pullman and General Electric also had production in 1981. * * *. With only the Budd Co. remaining in the industry and with it experiencing a substantial order backlog, capacity utilization will most likely increase considerably for some time.

Table 81.--Rail passenger cars: U.S. producers' capacity, production, 1/ and capacity utilization, 1977-81

Item	1977	1978	1979	1980	1981
Capacity--------------units--	***	***	***	***	***
Production--------------do----	803	318	268	239	150
Capacity utilization percent--	***	***	***	***	***

1/ Production data were not gathered, but they are assumed to approximate shipments.

Source: Estimated, in part, from data submitted in response to questionnaires of the U.S. International Trade Commission and from various issues of Railway Age.

Investment expenditures.--Only the Budd Co. reported investment expenditures. * * *.

Table 82.--Budd Co.'s investment expenditures, as of Sept. 30 of 1977-81

Item	Fiscal year ended Sept. 30--				
	1977	1978	1979	1980	1981
Real estate, plant, and equipment------------------	***	***	***	***	***
Research and development-----	***	***	***	***	***
Total--------------------	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaire of the U.S. International Trade Commission.

Profitability.--Most companies reported that because they were phasing out production, they could not separate data on the profitability of rail passenger car operations from other operations of their business. The Budd Co. supplied data only on the self-propelled railcar portion of its operations.

*   *   *   *   *   *   *

Table 83.--Profit-and-loss experience of the Budd Co. on its self-propelled railcar operations, fiscal year ended Sept. 30 of 1977-81

Item	1977	1978	1979	1980	1981
Revenues received from contracts------1,000 dollars--	***	***	***	***	***
Actual manufacturing costs do----	***	***	***	***	***
Gross profit or (loss)-do----	***	***	***	***	***
General, selling, and administrative expenses 1,000 dollars--	***	***	***	***	***
Net operating profit or (loss)------1,000 dollars--	***	***	***	***	***
Ratio of net operating profit or (loss) to revenues percent--	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaire of the U.S. International Trade Commission.

Employment.--The following tabulation shows data during 1977-81 for production and related workers employed in the production of rail passenger cars and is compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and is partially estimated by the staff of the U.S. International Trade Commission:

Year	Average number of persons employed
1977	***
1978	***
1979	***
1980	***
1981	***

In addition, the Budd Co. reported that for fiscal year ended September 30, 1982, such employment totaled * * *. * * *.

Major foreign competitors

During 1977-82, the U.S. market was penetrated with deliveries or orders obtained by car builders in Canada, Japan, France, Italy, and West Germany. 1/ The firms in Canada included Bombardier, UTDC, Canadian Vickers, and Hawker-Siddeley. Those in Japan included Kawasaki Heavy Industries, Tokyu Car, Nippon Sharyo, and Hitachi. The French builder, Franco-Belge, participated until its bankruptcy, when the SOFERVAL consortium (Alsthom-Atlantique) took over its contract. The French consortium, Francorail, recently won a contract in a joint venture with Westinghouse Electric. Breda in Italy and Siemans-DuWag in West Germany also obtained contracts. Numerous other foreign car builders also bid for contracts during this period and are listed, by contracts, in appendix I.

Canada.--With regard to Canadian producers, detailed information has been developed only for Bombardier, Inc., and the Urban Transportation Development Corporation Ltd. (UTDC). Although UTDC has not yet produced any rail cars for the U.S. market, it merits some discussion because of extensive bids in the U.S. market and some contracts for developing urban transportation systems for U.S. cities and because of its standing as a Corporation supported by the Province of Ontario. UTDC's sole shareholder is the Ontario government. An analysis of Canadian firms is provided in appendix I.

France.--Recent press reports suggest that research and development and production of rail passenger cars, especially subway cars, receive substantial support from the French Government. 2/ According to these reports, Sofretu (Societe Francaise d'Etudes et des Realisations de Transports Urbans) is "a company specially created by the state-owned Paris subway authority to sell its technology around the world." The Paris metro allegedly received substantial state aid in the past, which allowed it and its suppliers to establish a substantial technological and production know-how lead over world revivals. 3/ Thus, it was concluded that, although hard data could not be developed, the French, until recently, led the world in the exporting of designs and equipment for subway systems.

The following information concerning Italy and Japan is extracted from the Commission's February 1980 report: 4/

Italy.--The latest information available to the Commission shows that as of 1978, there were 12 firms in Italy producing rail passenger cars. Two of these firms, Breda and Fiat, manufacture nearly all of the components, which

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1/ Table 84 in the U.S. import section gives detailed data on the types of cars delivered and purchasers, by firms, 1977-81.

2/ Paul Lewis, The New York Times, Oct. 19, 1982, p. D1; Bob Kuttner, The New Republic, Nov. 15, 1982, p. 9.

3/ The Paris Metro is reported to have 3,478 cars, and Paris' Regional Express Line, 506 cars, Mass Transit, November 1981, p. 32.

4/ Rail Passenger Cars and Parts Thereof . . ., USITC Publication 1034, February 1980, pp. A-15 and A-16.

they then assemble into completed rail passenger cars. The remainder of the Italian rail passenger car industry more clearly resembles the U.S. industry in that they normally assemble cars from parts obtained from many different sources. In 1977, the Italian rail car industry employed approximately 8,800 workers. Available capacity to produce rail passenger cars in Italy was reported at 600 units a year in 1978; however, actual production has generally been between 250 and 350 units a year. 1/

Japan.--The Japanese market for rail passenger cars consists of four segments: the national, metropolitan, semipublic, and private railroads. Central and local government funds support all but the private railroads. The national railway, which is the major purchaser of rail passenger cars, requires that potential builders be certified as being qualified to produce rail cars. Currently, no foreign rail car producer is certified to build rail cars for Japan; however, officials of the Japan National Railway claim that their market is open and that any foreign builder may seek and obtain the required certification. The metropolitan railroad, like the national railroad, requires certification as a car builder prior to submission of a bid. The metropolitan railroad also requires that bidders have previous experience in producing rail cars for Japan. The semipublic and private railroads are not regulated by these Government procurement policies; however, Japanese railway officials have stated that the possibility of a foreign manufacturer winning a contract is extremely remote. 2/

From 1971 to 1976, production of rail passenger cars in Japan ranged from a low of 1,521 cars in 1971 to a high 2,376 cars in 1974. 3/ In 1976, when 1,676 rail passenger cars were produced in Japan, plant utilization was estimated as being at about 50 percent of capacity. 4/ The market shares of the eight Japanese rail passenger car producers, as reported in 1978, range between 3 and 20 percent. 5/

All Japanese manufacturers maintain close working relationships with major trading companies. Generally, if a large order with short lead time is placed with a trading company for delivery of rail passenger cars, the order may be divided among several car producers. Nearly all parts for assembly into Japanese rail passenger cars are sourced domestically. Cars which are built for export are the exception and may contain foreign components as

1/ Economic Intelligence Unit, (An Analysis of the International Urban Railcar Market, March 1978, Attachment 3, pp. 3-7.
2/ Economic Intelligence Unit, op. cit., pp. 36 and 37.
3/ Richard J. Barber Associates, Inc., The United States and International Market for Rail Equipment, March 1978, p. 8.
4/ General Accounting Office, Problems Confronting United States Urban Railcar Manufacturers in the International Market, July 1979, p. 22.
5/ Economic Intelligence Unit, op. cit., p. 15.

specified by the purchaser. 1/ An analysis of Kawasaki, the leading producer of rail cars in Japan, is included in appendix I.

Foreign Trade

Tariffs

Finished rail passenger vehicles, components, and parts are imported under various tariff provisions in the Tariff Schedules of the United States (TSUS). Table 85 shows the classification provisions and rates of duty applicable to imported finished rail passenger cars and to the major components and parts for such cars. It should be noted that none of these tariff provisions is devoted only to entries of rail passenger cars or parts thereof. For example, the TSUS item for axles covers axles not only for rail passenger cars, but also for locomotive and other railway rolling stock. This point is important because in recent years, entries of rail passenger cars have been mainly of parts of such cars rather than of finished cars, because the "Buy American" provisions of U.S. law require the final assembly of such cars in the United States when Federal funds have been used to purchase them.

U.S. imports

As noted earlier, official data on U.S. imports of rail passenger cars do not separately show the number of such cars obtained from foreign builders. Since 1978, "Buy American" provisions of U.S. law require final assembly of rail passenger cars in the United States and at least 50 percent U.S. components when Federal funds provided by UMTA are used. Few finished vehicles are imported into the U.S. because of the "Buy American" provision (see U.S. industry section), and, therefore, U.S. imports consist of components and parts which enter and are classified with components and parts for other rail vehicles and with certain other articles. Because of the high U.S. content required, the provisions of TSUS item 807.00 often have been used.

U.S. deliveries of complete rail passenger vehicles, by countries and by foreign car builders, as reported by Railway Age, are shown in table 84. Total rail passenger cars supplied by foreign car builders increased sharply from 10 in 1978 to 245 in 1981. The principal supplying country was Canada, which supplied about half or more of such cars in each year between 1977 and 1981, except for 1978, when 4 out of 10 came from Canada. Other suppliers included Japan, France, Italy, and West Germany. Most of the cars supplied by foreign builders have been rapid-transit cars. Prior to 1980, there were no imports of LRV's; such vehicles were supplied by a single U.S. firm. In 1981, however, slightly over one-third of all rail passenger cars supplied by foreign builders were LRV's and no U.S. car builder supplied LRV's.

1/ Economic Intelligence Unit, op. cit., pp. 36 and 37.

Table 84.--Rail passenger cars: U.S. deliveries by foreign car builders, by sources, by types of cars, by builders, and by purchasers, 1977-81

Source, type of car, builder, and purchaser	1977	1978	1979	1980	1981
Canada:					
Rapid transit:					
Hawker-Siddeley (Boston (MBTA))	0	4	40	47	120
Canadian Vickers (PATCO (Lindenwold))	0	0	12	42	2
Commuter:					
Bombardier (Chicago (RTA))	1/ 36	0	0	2/ 0	0
Total	1/ 36	4	52	2/ 89	122
Japan (Kawasaki):					
Light rail (Philadelphia (SEPTA))	0	0	0	2	67
Rapid-transit (Philadelphia (SEPTA))	0	0	0	0	2
Total	0	0	0	2	69
France (Franco-Belge):					
Rapid-transit (Atlanta (MARTA))	0	6	48	38	34
Italy (Breda):					
Light rail (Cleveland (GCRTA))	0	0	0	0	20
West Germany (Siemans-Duklag):					
Light rail (San Diego (MTDB))	0	0	0	14	0
Grand total	36	10	100	143	245

1/ According to annual public reports of Bombardier, these cars were delivered in 1978 and 1979.

2/ Bombardier supplied 2 Light, Rapid, Comfortable (LRC) locomotives and 10 LRC intercity coaches under a lease-purchase agreement to Amtrak.

Source: Compiled from various issues of Railway Age, except as noted.

Table 85.--Rail passenger cars and certain parts: U.S. rates of duty, present and negotiated, by TSUS items, 1982

(Percent ad valorem; cents per pound)

TSUS item 1/	Description	Present col. 1 rate of duty 2/	Negotiated col. 1 rate of duty 3/	Present col. 2 rate of duty 4/	LDDC 5/
661.20A	Air-conditioning machines and parts thereof.	4.3	2.2	35	2.2
682.50A	Motors of $200 or more horsepower.	5.3	4.2	35	4.2
685.90A*	Electrical switches and control panels and parts thereof.	7.3	5.3	35	5.3
690.10A	Self-propelled rail vehicles designed to carry passengers or articles.	9.6	6.3	35	6.3
690.15A	Passenger, baggage, mail, freight, and other cars, not self-propelled.	18.0	6/	45	
690.25	Axles and parts thereof, and axle bars, all of the foregoing of iron or steel.	0.5	6/	3	
690.30	Wheels and parts thereof and any such wheels or parts imported with iron or steel axles fitted in them.	Free	Free	1¢	
690.35A	Other parts of rail locomotives and rolling stock:				
	Parts of cars provided for in item 690.15, except brake regulators.	7.7	5.5	45	5.5
690.40A	Other	4.9	3.9	35	3.9

1/ The designation "A" or "A*" indicates that the item is currently designated as an eligible article for duty-free treatment under the U.S. Generalized System of Preferences (GSP). "A" indicates that all beneficiary developing countries are eligible for the GSP. "A*" indicates that certain of these countries, specified in general headnote 3(c) of the Tariff Schedules of the United States Annotated, are not eligible. The GSP, under title V of the Trade Act of 1974, provides duty-free treatment of specified eligible articles imported directly from designated beneficiary developing countries. GSP, implemented by Executive Order No. 11888 of Nov. 24, 1975, applies to merchandise imported on or after Jan. 1, 1976, and is scheduled to remain in effect until Jan. 4, 1985.

2/ Rate in effect Jan. 1, 1982. The rates of duty in rate of duty column 1 are most-favored-nation (MFN) rates, and are applicable to imported products from all countries except those Communist countries and areas enumerated in general headnote 3(f) of the TSUSA. However, such rates would not apply to products of developing countries which are granted preferential tariff treatment under the GSP or under the "LDDC" rate of duty column.

3/ Final rate negotiated under the Tokyo round of the Multilateral Trade Negotiations (MTN), to be achieved through 8 annual staged duty reductions effective Jan. 1, 1987.

4/ The rates of duty in rate of duty column numbered 2 apply to imported products from those Communist countries and areas enumerated in general headnote 3(f) of the TSUSA.

5/ The rates of duty in rate of duty column "LDDC" are preferential rates (reflecting the full U.S. MFN concessions rate for a particular item without staging) and are applicable to products of the least developed developing countries designated in general headnote 3(d) of the TSUSA which are not granted duty-free treatment under the GSP. If no rate of duty is provided in the "LDDC" column for a particular item, the rate of duty provided in column 1 applies.

6/ Duty was not reduced.

Source: Presidential Proclamation No. 4707, 44 F.R. 72348, Dec. 13, 1979, and the TSUSA.

U.S. exports

U.S. car builders had exported no rail passenger cars in nearly 20 years when Budd delivered 6 SPV-2000 self-propelled commuter cars to Morocco in 1979. No other rail passenger vehicles have been exported since then. Several domestic manufacturers reportedly submitted bids over the years on contracts to Canada, Europe, Egypt, and Venezuela, but failed to win any contracts. Officials of Budd indicate that they have sought entry to virtually every market in the world with little success, primarily because of closed markets. The only success attained has consisted of licensing of design and production technique.

The Current U.S. Market

Description of U.S. market 1/

The total U.S. market for rail cars is composed of a freight car and a passenger car market. 2/ The U.S. freight car fleet is approximately 100 times the size of the domestic passenger car fleet. The source of funds for freight car purchases is largely private; passenger car purchases are nearly all Government funded, and most of these purchases involve Federal funds. New York City funding procedures in purchasing the R-62 subway cars, which did not involve Federal funds, are atypical, as was the use of foreign government export credit subsidies. This situation will be discussed in detail in the case study section, see appendix J. Passenger car prices range from about $400,000 to over $1,000,000 a car. Although there are several types of freight cars, their design is far more standardized than that of passenger cars.

The domestic market for rail passenger cars can be divided into two segments, the National Rail Passenger Corp. (Amtrak) and local or regional transit authorities. Amtrak is the major purchaser of intercity cars; transit authorities are the major purchasers of rapid-transit cars, LRV's and suburban cars. Although a few railroads own a small number of rail passenger cars, they are an insignificant part of the total U.S. fleet.

The size of the U.S. rail passenger car fleet has decreased significantly over the years, primarily because of the increasing use of automobile and air travel and because transit authorities have allowed a significant deterioration of their capital stock, including rail passenger cars. The composition of the U.S. rail passenger car fleet as of Dec. 31, 1980, the latest data available,

1/ Rail Passenger Cars and Parts Thereof . . ., USITC Publication 1034 February 1980, pp. A-8 and A-9.

2/ Railroads also utilize a small number of specialized vehicles for track maintenance. These vehicles are not included in the market for rail cars, nor are locomotives.

is shown below. The New York City subway system accounted for approximately 6,300 of the 9,700 rapid-transit cars shown in the following tabulation: 1/

Item	Quantity
Light rail------------------	1,013
Rapid-transit---------------	9,693
Commuter and intercity------	6,648
Total-------------------	17,354

Factors influencing market demand.--Many factors influence demand for rail passenger cars. Important factors affecting the demand for intercity cars have been increased amounts of air travel and the Federal Government subsidization of the interstate highway system, which allowed individuals to travel rapidly by private automobile from city to city throughout the United States.

The commitment to urban mass transit by Federal and local policy makers also affects the availability of transit systems and the demand for rail passenger cars to operate on those systems. In addition, the costs and feasibility of operating rail systems must be weighed against the cost of operating a bus system. The availability of highways noted earlier also extends to urban areas and has allowed individuals to operate automobiles in increasing numbers, decreasing the demand for mass-transit vehicles. Of course, the price and availability of gasoline and parking affect the amount of automobile use. Increased gas prices in the 1970's renewed interest in the use of rail passenger cars in general.

Apparent U.S. consumption.--Data in table 86 show that consumption of rail passenger cars dropped sharply from 839 in 1977 to 328 in 1978 and then rose gradually to 395 in 1981. The large number of cars delivered in 1977 reflects the large and small, discrete, batch nature of the procurement process. Several large orders for rapid-transit cars and an order for intercity cars were completed or nearing completion in 1977. In addition, U.S. car builders were leaving the prime contracting business, and foreign car builders were entering the market. Thus, the ratio of imports to consumption increased sharply from 3 percent in 1978 to 62 percent in 1981, when Budd was the only remaining firm seeking prime contracts and Pullman-Standard and General Electric were completing orders obtained in earlier years. However, it should be noted that, because of "Buy American" provisions of U.S. law, a substantial proportion of the parts and materials used by foreign car builders are of U.S. origin.

1/ American Public Transit Association and Amtrak.

Table 86.--Rail passenger cars: U.S. producers' deliveries, exports of domestic merchandise, imports for consumption, and U.S. consumption, 1977-81

Year	Producers' deliveries	Exports 1/	Imports	Apparent consumption	Ratio of imports to consumption
	Units				Percent
1977	803	0	36	839	4.3
1978	318	0	10	328	3.0
1979	268	6	100	362	27.6
1980	239	0	143	382	37.4
1981	150	0	245	395	62.0

1/ Data for 1977-79 are compiled from responses received from questionnaire sent to producers by the U.S. International Trade Commission. Data for 1980 and 1981 are based on discussions with industry officials.

Source: Compiled from various issues of Railway Age, except as noted.

Another way to focus on domestic market penetration by imports in recent years is to examine deliveries by types of vehicles. The following tabulation shows total U.S. deliveries of rail passenger cars during 1977-81, by types of vehicles and by sources:

Type and source	Quantity	Percent of total
Rapid-transit:		
Domestic	694	64
Foreign	395	36
Total	1,089	100
Commuter:		
Domestic	497	93
Foreign	36	7
Total	533	100
Intercity:		
Domestic	409	100
Foreign	1/ 0	-
Total	409	100
Light rail:		
Domestic	178	63
Foreign	103	37
Total	281	100
Grand total:		
Domestic	1,778	77
Foreign	534	23
Total	2,312	100

1/ In 1980, Bombardier, Inc., of Canada supplied 2 Light, Rapid, Comfortable (LRC) locomotives and 10 LRC intercity coaches under a lease-purchase agreement to Amtrak.

These data show that the largest U.S. market during 1977-81 was for rapid-transit cars and that U.S. producers supplied 64 percent of total deliveries. U.S. producers supplied virtually all commuter cars and intercity cars. However, for the smallest market, LRV's, a U.S. producer supplied 63 percent of total deliveries. During this period, only Boeing-Vertol supplied LRV's and it announced that it has ceased bidding for prime contracts. The Budd Co. bid on several prime contracts to produce LRV's during this period, but has not won any contracts to produce LRV's and has not produced any in recent years.

Table 87 shows U.S. deliveries, by types of cars, from U.S. and foreign suppliers during 1977-81. The data show that large deliveries of rapid-transit cars by foreign producers began in 1979 and that U.S. producers' deliveries virtually ceased in that year. Only Boeing-Vertol supplied the U.S. market with LRV's in 1979. In 1981, only foreign suppliers delivered LRV's to the U.S. market.

Table 87.--Rail passenger cars: U.S. deliveries, by types and by sources, 1977-81

(In units)

Type and source	1977	1978	1979	1980	1981
Rapid-transit:					
Domestic	500	170	10	0	14
Foreign	0	10	1/ 100	127	158
Total	500	180	100	127	172
Intercity:					
Domestic	113	1	61	134	100
Foreign	0	0	0	2/ 0	0
Total	113	1	61	134	100
Light rail:					
Domestic	61	16	71	30	0
Foreign	0	0	0	16	87
Total	61	16	71	46	87
Commuter:					
Domestic	129	131	126	75	36
Foreign	3/ 36	0	0	0	0
Total	165	131	126	75	36
Grand total:					
Domestic	803	318	268	239	150
Foreign	36	10	100	143	245
Total	839	328	368	382	395

1/ 40 cars reported by Railway Age, as commuter cars are rapid-transit cars. Hawker Siddeley delivered only rapid-transit cars to Boston.

2/ Bombardier, Inc., of Canada supplied 2 Light Rapid Comfortable (LRC) locomotives and 10 LRC intercity coaches under a lease-purchase agreement to Amtrak.

3/ According to annual public reports of Bombardier, Inc., of Canada, these cars were delivered in 1978 and 1979.

Source: Compiled from various issues of Railway Age, except as noted.

Factors of Competition in the U.S. Market

Raw materials

Information on raw materials and on other factors of competition will cover only the Budd Co. with regard to the domestic industry, because it is the only U.S.-based firm still seeking prime contracts. * * *. 1/

Labor costs

* * * * * * *. 1/

Capital formation

* * *." 1/ Information presented in the major foreign competitors section and the case studies in appendix J of this report point toward government aid in this area.

Technology

* * * * * * *. 1/

Quality and price

Because virtually every purchase of rail passenger cars requires equipment built to the particular specifications of the individual purchasing authority, comparisons between the quality and prices of different producers are very difficult. In addition, many of the same suppliers of major subcomponents supply both U.S. and foreign carbuilders, especially since the imposition of "Buy American" provisions. The specifications of major subcomponents required by the purchasing authority often force the car supplier, whether U.S. or foreign, to purchase from the same U.S. subcomponent supplier.

Foreign Export Credit Subsidies and their Impact on the U.S. Industry

The financing of rail passenger car purchases

The financing of rail passenger car purchases is changing dramatically. Because UMTA financing is being reduced, transit authorities are seeking new

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1/ Data submitted in response to questionnaire of the U.S. International Trade Commission.

sources of financing, such as bonds. Rapidly increasing interest rates and growing uncertainty in the tax-exempt bond market spurred some transit authorities to also seek seller financing. Only importers have offered financing on rail passenger cars or their components. 1/

Only one transit authority has actually used seller financing. Seller financing is less attractive to transit authorities than to corporations, because interest rates on tax exempt bonds are generally lower than interest rates on bank loans or corporate bonds. Furthermore, declining interest rates in the tax-exempt bond market may limit the importance of seller financing, particularly if foreign export credit agencies adhere to the Organization for Economic Cooperation and Development (OECD) arrangement.

Sources of financing.--From 1977 to 1981, purchases of self-propelled railcars were almost entirely financed by UMTA grants. 2/ Because mass-transit officials expect these grants to be cut back substantially, they have begun to look for alternative sources of financing. The major alternative sources are bonds, fares and tax revenues, leasing, and seller financing. The relative future importance of these methods depends on both political and economic factors.

Public-transit authorities were first attracted to leasing by the safe-harbor leasing provision of the Economic Recovery Tax Act of 1981. This law allows private firms to reduce their taxes by buying transit vehicles and leasing them to transit authorities. Because of these tax savings, firms are willing to give transit authorities very favorable terms on their leases. However, the safe-harbor leasing provision of this law expires at the end of 1983. 3/

Transit authorities' ability to raise money by increasing taxes and fares is limited by political considerations. The authorities also fear that raising fares will drive away passengers, but generally a substantial increase in fares will cause only a relatively small decline in ridership. Because purchasing railcars calls for a large, nonrecurring expenditure, authorities generally will not finance these purchases totally through taxes or fares. Instead, they will finance them through a form of debt such as bonds or a lease, and then use fares and tax revenues to service that debt.

Bonds issued by transit authorities generally carry lower interest rates than corporate bonds, because interest on transit authority bonds is tax exempt. The interest rate on tax-exempt bonds varies with the creditworthiness of their issuer; rates on high- and medium-grade bonds are

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1/ A domestic car builder, Budd, offered financing but only on certain imported components of its car.

2/ UMTA grants would finance 80 percent of the cost of a purchase, the rest would be financed through bonds and tax and fare revenues.

3/ Safe-harbor leases can be used for mass-transit vehicles placed in service before Jan. 1, 1988. If uncontrollable circumstances prevent a vehicle from being put in service before 1988 and the purchase contract was signed before Apr. 1, 1983, a safe-harbor lease can still be used.

shown in table 88. These rates have more than doubled since 1977. Since January 1982, however, these rates have steadily declined.

Table 88.--Interest rates on State and local bonds, 1977-81, January 1982, and July 1982

(In percent)

Period	Medium-grade	High-grade
1977	6.12	5.20
1978	6.27	5.52
1979	6.73	5.92
1980	9.01	7.85
1981	11.76	10.43
1982:		
January	13.95	12.30
July	13.17	11.47

Source: U.S. Federal Reserve Board, Federal Reserve Bulletin, various issues.

Seller financing of imports.--Seller financing so far has only been offered on foreign railcars or components. At least three transit authorities began actively seeking seller financing because of high interest rates on bonds and uncertainty concerning future rates. 1/ Only one transit authority has received seller financing. This authority negotiated two separate contracts involving financing; it since has canceled the financing option in one contract due to declining interest rates on bonds. The future significance of seller financing of rail passenger cars is uncertain. Because interest on transit authority bonds is tax exempt, seller financing may be less attractive to transit authorities than it would be to private businesses. Declining interest rates and adherence to the terms of the OECD arrangement may also limit the future importance of seller financing.

The only two cases in which a transit authority accepted a bid that included seller financing involve the New York Metropolitan Transit Authority (MTA). 2/ MTA had not previously issued bonds and feared that it would have to pay interest rates of 14 percent or more. To maintain flexibility, MTA asked its suppliers to offer financing. MTA signed two contracts that involved seller financing. One contract was with Nissho Iwai of Japan; the other was with Bombardier of Canada. 3/ In each case, the winning bidder

1/ A fourth transit authority, Bay Area Rapid Transit (BART), received informal suggestions that seller financing was available. BART, however, stated that it neither solicited nor received formal offers of financing.

2/ These two cases are fully described in app. J. This appendix includes a detailed discussion of the financing terms offered in each bid and a present-value analysis of the competing bids.

3/ The Export-Import Bank of Japan provided seller financing and the Economic Development Corporation of Canada provided buyer financing.

offered to finance a larger part of the contract at better terms than Budd, the only competing domestic bidder. 1/

MTA has issued bonds since it agreed to these contracts. The average interest rate of the bonds it sold in early October 1982 was 9.7 percent. This interest rate is substantially below the 12.25-percent interest rate charged by Nissho Iwai and equal to the rate on the Canadian Export Development Corporation (EDC) financing. Since issuing these bonds, MTA has exercised a contract option to purchase Nissho Iwai's cars without using seller financing. MTA will use the EDC financing.

Since accepting the Nissho Iwai and Bombardier contracts, MTA has arranged one other large purchase of rail passenger cars. MTA accepted the bid of a U.S.-French consortium which offered no seller financing over the bids of Budd and Sumitomo, which did offer seller financing.

The Metropolitan Atlanta Rapid Transit Authority (MARTA) has not specifically asked bidders for financing, but it has asked for innovative proposals to reduce costs, and it expected financing offers in response to this request. MARTA discussed financing terms with some bidders when negotiating a recent contract. The successful bidder, however, did not offer seller financing. MARTA has never received seller financing.

Houston Metro is actively soliciting offers of seller financing in its request for bids to supply 130 rail passenger cars. Responses to this request are due on January 12, 1983; until then it can only speculate about whether it will use seller financing for these cars. 2/ * * *.

Sales experience of the U.S. industry, January 1977-November 1982

(Information contained in the following section is alleged by the domestic self-propelled railcar industry. Data received from one U.S. purchaser of self-propelled railcars dispute this claim).

Volume of lost sales.--Appendix K shows a list of contracts awarded to foreign car builders in the U.S. market from January 1977 to November 1982. The following tabulation shows data on these awards, by types of cars, for this period. 3/

1/ Budd offered to arrange financing for part of the railcars that was to come from Brazil and Portugal. That financing was to be arranged through the official export credit agencies of those countries.

2/ * * *.

3/ UMTA, Amtrak, various purchasers, the Budd Co., and various issues of Railway Age.

Type	1977	1978	1979	1980	1981	January-November 1982	Total
Rapid-transit---	66	0	94	125	260	1,555	2,100
Light rail------	48	0	155	0	69	55	327
Commuter--------	0	0	0	153	0	8	161
Intercity-------	0	1/ 0	0	0	0	0	0
Total-------	114	0	249	278	329	1,618	2,588

1/ Bombardier, Inc., agreed to a lease-purchase agreement with Amtrak for 10 cars.

Purchase contracts awarded to foreign car builders totaled 2,588 cars during the entire period, or 62 percent of total purchase awards of 4,149 cars. Out of the 2,588 cars, 81 percent were rapid-transit cars, 13 percent, light rail vehicles, and 6 percent, commuter cars. Clearly, the largest contracts awarded during this period were for the 1,150 R-62 rapid-transit cars during 1982 by the MTA of New York, as they, combined, accounted for 28 percent of all cars contracted for during the period. The absolute amounts were also the largest for single contracts, without options: 825 to Bombardier, Inc., of Canada and 325 to Nissho-Iwai (Kawasaki Heavy Industries) of Japan. These two contracts were also the only two known to involve foreign government export credit financing. The Budd Co. alleges that it lost both of these sales because of the superior financing supplied by the foreign governments (app J).

Factors, other than export credit terms, for lost sales.--As explained earlier, under competitive bidding procedures, the lowest responsive responsible bidder must be awarded the contract by the purchasing authority under Federal, State, and local laws. Thus, if a bidder submitted a bid with the lowest price per car, the only factor which would disqualify it would be failure to submit a technologically responsive car design. However, under negotiated bidding, a number of other factors were cited by the MTA as affecting the decisions to award contracts for the R-62's. These will be discussed at length in the case study section in appendix J. Authorites in Atlanta and Houston also received legislative authorization to undertake negotiated bidding, which may likely lead other authorities to adopt this procedure, potentially introducing a much broader range of factors, including vendor financing, into the decisionmaking process.

Impact of lost sales.--The impact of lost sales due to foreign export credit subsidies alleged by Budd Co. is shown in table 89. * * *.

Table 89.--Rapid-transit cars: Impact of lost sales on certain industry indicators, 1983-85 2/

Item	1983	1984	1985
Production added 1/--------------------units--:	***	***	***
Employment added:			
All persons-------------------------number--:	***	***	***
Production and related----------------do----:	***	***	***
Profits (loss) before taxes added 1,000 dollars--:	***	***	***
Investment added-----------------------do----:	***	***	***

1/ * * *.
2/ * * *.

Source: Compiled from data submitted in response to a questionnaire of the U.S. International Trade Commission.

Likely Future Trends in the U.S. Market

An indication of likely future trends in the U.S. market are anticipated orders for rail passenger cars in the United States during 1982-88, shown in table 90, by purchasers, and by types of cars. It should be noted that the primary market in this period is for rapid-transit cars. Total orders were expected to range from about 2,400 to 2,800 units. However, 1,796 units, or nearly two-thirds, have already been committed, with the 1,150 R-62 subway cars ordered by the MTA accounting for nearly two-thirds of such orders.

The uncertainty of rail-transit funding clouds future market trends. During the 1970's, the Department of Transportation, through the UMTA, provided substantial operating and capital assistance subsidies for mass-transit systems in the United States. Current Government funding plans have eliminated the availability of funds for new subway starts and call for reduced operating subsidies for mass transit in general. However, funding will continue for systems currently being built and for replacement of rail passenger cars and other capital replacement items. Alternative forms of financing may become more of an issue with U.S. purchasers if Federal funds are reduced.

In December 1982, an increase of 5 cents a gallon in the sales tax on gasoline and diesel fuel was imposed. One cent of that increase is earmarked for mass-transit capital funding. This may relieve some of the funding pressures on State and local governments seeking to newly purchase and to replace such vehicles during times of fiscal austerity.

A recently released study suggests that 14 cities could install some form of rail transit on a cost-effective basis in savings of energy, land, labor, and passenger time. Strong candidates for rapid-transit construction include

Table 90.--Rail passenger cars: Anticipated orders in the U.S. market, by purchaser and by type of car, 1982-88

(In units)

Purchaser	Type of car			Total
	Rapid transit	Light rail vehicle	Commuter	
Atlanta (MARTA)	30-100	-	-	30-100
Boston (MBTA)	-	50-100	-	50-100
Cleveland (GCRTA) 1/	60	-	-	60
Connecticut (CDOT)	-	-	100	100
Detroit (SEMTA)	-	88	17-45	105-133
Honolulu	85	-	-	85
Los Angeles (SCRTD)	120-132	-	-	120-132
New Jersey (NJ Transit)	-	-	0-37	0-37
New York (NYCTA) 2/	1,376	-	-	1,376
New York (MTA-Conrail) 3/	-	-	126	126
New York (MTA-LIRR) 3/	-	-	146	146
Philadelphia (SEPTA)	15	30	50	95
Pittsburgh (PAT) 4/	-	55	-	55
Sacramento (STDA)	-	26-28	-	26-28
San Francisco (BART)	64-154	-	-	64-154
San Francisco(MUNI)	-	34-42	-	34-42
Total	1,750-1922	283-343	439-504	2,472-2,769

1/ Purchased 60 rapid-transit cars from Tokyu Car, Japan.
2/ Purchased 325 rapid-transit cars from Nissho-Iwai America (Kawasaki Heavy Industries, Japan) and plans to purchase 825 rapid-transit cars from Bombardier, Inc., Canada.
3/ Purchased 130 commuter rail cars from Budd Co. in 1981 and exercised an option for 186 additional cars for these systems out of the 272 cars anticipated.
4/ Purchased 55 light rail vehicles from Siemens, Inc., West Germany.

Source: Railway Age, Jan. 11, 1982, p. 15, and the Urban Mass Transportation Authority.

Los Angeles, Seattle, Honolulu, and Houston. Seattle, Honolulu, and Houston are also serious candidates for light rail contruction. Other candidates for light rail include Dallas, St. Louis, Milwaukee, Minneapolis, Indianapolis, Louisville, Cincinnati, Denver, Columbus, and Kansas City. Following the study's implicit recommendations, the rapid-transit cities would put in 180 miles of lines, and the light rail cities would install 200 miles. 1/

With the Budd Co. as the only remaining U.S.-based prime contractor, its is likely that foreign-based prime contractors will obtain a portion of future contracts. However, at least where "Buy American" provisions apply, half the material content must be of U.S. origin. This means that U.S. subassembly and parts suppliers should continue to get a substantial part of available business. In negotiated bidding where "Buy American" provisions do not apply, purchasing authorities may allow the substitution of foreign content to lower price and U.S. subassembly and parts suppliers may also lose business. This makes alternative financing methods a crucial issue.

At least one subassembly and parts supplier, Westinghouse Electric Corp., has taken a flexible approach to its role as supplier to domestic and foreign car builders. For example, it recently entered into a joint venture with Amrail, a U.S. corporation, which is wholly owned by Francorail of France, to supply 225 rapid-transit cars to New York City. Perhaps other parts suppliers will follow this lead.

In the absence of increased U.S. production of self-propelled railcars, the U.S. market for such rail cars will likely be supplied by imports. Based on 1980 production/employment relationships, each $100 million in production of self-propelled rail cars not undertaken by U.S. firms translates into an estimated $240 million in lost production opportunities in all sectors of the U.S. economy and approximately 2,860 jobs not created. 2/ In the self-propelled rail car sector alone, about $108 million in potential production is lost along with approximately 1,260 jobs. The estimated effect on the entire U.S. economy, assuming $100 million of lost production opportunities, is summarized in the following tabulation:

1/ Boris S. Pushkarev, Jeffrey M. Zupan, and Robert S. Cumella, Urban Rail in America: An Exploration of Criteria for Fixed-Guideway Transit, 1982, p. 195.

2/ These estimates are based on the Bureau of Labor Statistics (BLS) input-output model. In the BLS model, certain components of rail cars are double counted; therefore, the "output lost" data are overstated.

Effects of $100 million in lost production opportunities of railcars on U.S. industries' output and employment

Industry sector	Employment lost	Output lost
	Number of employees	Million dollars
Rail cars	1,259	107.8
Other manufacturing	997	102.0
Other	607	31.6
Total	2,863	241.4

EXPORT CREDIT SUBSIDIES

Most industrialized countries can provide medium-term (2 to 5 years) and long-term (over 5 years) credit to encourage the export of domestic goods and services. The export credit mechanisms used vary widely from country to country, but these methods universally attempt to provide financing rates and terms that are more favorable than those which are available from private sources. Official support of export financing occurs in two ways--through Government-supported insurance and guarantees programs and through direct Government support of interest rates and capital supply.

Insurance programs are a part of virtually all export financing packages offered by most governments and act to provide political and commercial risk insurance to exporters. Such insurance reduces the risk to the financing organization and therefore permits longer payout terms and lower interest rates to purchasers that would not otherwise be considered qualified to receive the longer terms and lower rates. Some of the official export credit programs of competing countries also include in their export insurance programs other types of coverage, such as exchange-rate risk insurance and inflation insurance.

Official support for exports comes in the form of direct loans either to the buyer or seller. Official loans are typically offered at fixed interest rates at a level below commercially available market rates at the time of financing. In the majority of countries, official export credit is provided through individual banks or through specialized intermediaries. For other countries, the bulk of longer term export credits are directly provided by Government agencies. 1/

Official export credit is monitored by the Organization for Economic Cooperation and Development (OECD), to which the U.S. and its major trading partners are members. The use of Government-sponsored financial programs is not considered anticompetitive by OECD member countries 2/ unless the level of official support exceeds OECD guidelines. The OECD guidelines on export credit financing are prescribed by the Group on Export Credits and Credit Guarantees (ECG) of the OECD Trade Committee. These OECD general guidelines do not apply to commuter aircraft, because such aircraft are covered by a separate OECD standstill agreement.

In 1976, the ECG reached an informal consensus that stipulated minimum interest rates, maximum period for loan payback, and minimum down payments for most officially supported, medium-term and long-term export credits. 3/ In

1/ The Export Performance of the United States, edited by Center for Strategic and International Studies, 1981, p. 191.

2/ The members of OECD are Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Greece, Iceland, Ireland, Italy, Japan, Luxemborg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

3/ OECD, The Export Credit Financing Systems in OECD Member Countries, 1982, p. 7.

1978, these rules were formalized into the Arrangement on Guidelines for Officially Supported Export Credits in which all OECD members, except Iceland and Turkey, are participants. 1/

The arrangement provided that the minumum down payment of 15 percent of the contract price be paid prior to the beginning of the credit period. 2/ In addition, interest rate minimums were established, based upon the relative wealth of the recipient country and the length of loan. These guidelines are adjusted periodically to reflect general economic conditions of world capital markets.

The arrangement excludes certain categories of exports, including military equipment, agricultural commodities, nuclear power plants, ships, and aircraft. Regarding the products covered by this report, only the financing of aircraft is included in a separate agreement, called the standstill agreement, which was concluded in 1975. The terms of the standstill agreement state that no more than 90 percent of a purchase may be financed with a maximum term of 10 years for large jet aircraft, 7 years for turboprop aircraft (i.e., most commuter aircraft) and helicopters, and 5 years for other subsonic aircraft. 3/ The standstill does not set guidelines for interest rates, except that major participants must agree to refrain from granting more concessionary terms than those offered at the time the Standstill went into effect. To date, further OECD negotiations on interest rate guidelines have involved only large commercial aircraft. However, negotiations with supplying countries regarding the financing of commuter aircraft are to begin in early 1983. 4/

Official subsidization of export financing has been a factor in international trade for more than 60 years. During this period, countries have been flexible in adjusting their official credit support to changing export competition. Table 91 gives an indication of the various programs offered by the United States and its major trading partners.

There are a number of elements to be considered in the competitiveness among the various official export credit support programs offered by major exporting countries. The most important elements are the number and variety of programs used, the effectiveness in the way the programs are used, and the quantity of funds available in relationship to total exports. In a 1980

1/ Ibid., p. 8.

2/ G. Holliday, J. Gravelle, P. Wertman, D. Driscall, and A. Khalid, Export-Import Bank: Selected Issues 22, Congressional Research Service Report No. 81-109E, 1982.

3/ The Labor Industry Coalition for International Trade, The Erosion of America's Competitive Edge, May 1982, p. 18.

4/ Telephone conversation with officials of the Department of the Treasury, Nov. 19, 1982.

Table 91.--Types of export credit and insurance programs available in the United States and selected trading partners, 1980

Type	United States	Canada	France	West Germany	Italy	Japan	United Kingdom
Preferential medium- and long-term fixed-rate export credits	X	1/ X	X	X	X	X	X
Financial guarantees	X	X	X	X			X
Commercial and political risk insurance	X	X	X	X	X	X	X
Inflation risk insurance			X				X
Exchange-rate risk insurance		X	X	X	X	X	X
Mixed credits 2/	X		X	X		X	X
Performance and bid bond guarantees/ insurance	3/ X	X	X	X	X	X	X
Local cost support		X	X	X	X	X	X

1/ Long-term export credits only.

2/ Although the countries indicated have used mixed credits, the extent of this usage has varied widely.

3/ Offered through the Overseas Private Investment Corporation.

Note.--The "X" indicates the existance of a program. It does not provide a comparative analysis of the specific terms of the programs offered by individual countries.

Source: Center for Strategic and International Studies, The Export Performance of the United States: Political Strategic and Economic Implications, 1981, p. 211.

survey conducted for the the U.S. Government, the Eximbank was compared with similar institutions in France, West Germany, Italy, Japan, and the United Kingdom regarding the competitiveness of official export support programs. The United States' overall position in this survey on competitiveness was last.

The effect of export credit subsidies on the cost of contracts

Interest rates seem to be the most important difference between export credits and market financing. The export credit terms considered are those accepted in the "Arrangement on Guidelines for Officially Supported Export Credits" of the OECD. Aircraft are not covered by this arrangement. The terms used in aircraft export credits were examined earlier in this report.

The cost of equipment purchases using export credits can be compared with the cost of purchases using market financing. This comparison is possible using present value analysis, the most common method of comparing the costs of two different contracts that each call for a series of payments to be made. This analysis indicates that export credits allowed under OECD guidelines can reduce the cost of purchasing equipment from 4.0 to 8.5 percent.

Choosing comparable market credit terms.--The international credit markets offer a wide variety of loans, and these loans are made under many different terms. When comparing market credit terms with export credit terms, it is important to choose the market terms for a loan that is truly comparable with the export credit. Factors differentiating loans include the currency involved, whether the borrower is a commercial or government entity, and whether the interest rate is fixed or variable.

Most export credits that U.S. importers receive are in U.S. dollars; therefore, the terms of these credits are compared with the terms of commercial loans of U.S. dollars rather than with terms of loans of a foreign currency. Loans in different currencies carry different interest rates for two major reasons--exchange-rate risk and restrictions on capital market access. If loans of one currency carry more favorable interest rates than loans of other currencies, then demand for loans in that currency will increase. This increase in demand generally will cause interest rates for that currency to rise to the level of the other currencies' rates. However, borrowers will not seek loans in a currency offering relatively low interest rates if they believe that currency's value will increase before they repay the loan or if government regulations restrict access to their capital markets. 1/ For example, the Japanese Government has long restricted foreigners' ability to borrow in its domestic capital markets. 2/

If a U.S. importer receives a foreign export credit in the exporting country's currency, exchange-rate changes may either help or hurt that importer. Because of the exchange-rate risk, foreign and U.S. currency loans are not equivalent. Furthermore, if access to the foreign-capital market is restricted, loans in the foreign currency might not be an available alternative for the U.S. importer. The terms of a U.S.-dollar-denominated export credit, therefore, should be compared with terms of U.S. dollar loans rather than with loans of the exporting country's currency. However, export credits in the exporting country's currency cannot necessarily be compared with commercial loans in that currency. If a foreign government restricts

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1/ A recent credit subsidy provides an interesting example of how exchange-rate risk can affect loan costs. The Export Import Bank of Japan recently supported Kawasaki Heavy Industries' sale of 325 subway cars to the MTA with a yen-denominated loan to Kawasaki equivalent to $126 million at a 9.0-percent interest rate. Kawasaki then relent the money to MTA in dollars that charged an exchange-rate risk premium that raised the effective interest rate to 12.25 percent. Statement of R. T. McNamar, Deputy Secretary of the Treasury, before the Committee on Finance, U.S. Senate, May 28, 1982, p. 1.

2/ Recently, Japan has eased these restrictions. Bank of Tokyo, Tokyo Financial Review, vol. 7, No. 5, May 1982, pp. 1 and 2.

foreigners' access to its credit markets, it will reduce effective demand for loans in its currency and thus may lower interest rates for those loans. If the government then gives U.S. importers of its products loans in its currency, it is granting them access to capital markets they otherwise could not enter. The benefits of that special access may be significant enough to lead the purchaser to buy that country's export rather than a competing product. Foreign currency export credits, therefore, should be compared only with commercial loans of that currency if those loans are available to U.S. borrowers that are not buying that country's exports. Governments commonly pay lower interest rates than commercial lenders, because lenders believe governments are less likely to default on loan payments than are private firms. By guaranteeing an export loan, a government may be able to substantially lower the interest rate on that loan, because the lender is protected against default. Such a guarantee may give exports a substantial competitive advantage over products that must be financed at normal commercial rates. Therefore, rates on export credits to commercial borrowers should be compared with rates on commercial, not government, loans. Furthermore, because commercial borrowers vary in their perceived likelihood of default, export credit subsidy terms should be compared with terms offered borrowers of comparable creditworthiness.

Credit agreements may be at fixed interest rates or at interest rates that vary over the life of a contract. Because of the recent volatility of interest rates, commercial lenders are becoming increasingly reluctant to make loans at fixed interest rates. Export credits, as far as is known, are always at fixed rates. Because a fixed-rate contract protects the borrower from interest rate fluctuations, borrowers prefer fixed-rate contracts assuming all else equal. Thus, fixed- and variable-rate contracts are not strictly comparable. However, because fixed-rate contracts are increasingly rare in the credit markets but dominate export credits, in some cases, fixed- and variable-rate contracts will be compared. These comparisons somewhat underestimate the advantages of the fixed-rate contracts.

Choosing actual rates.--The market interest rates that will be used in comparing export credits with market financing will be rates on commercial dollar-denominated loans that banks charge highly or reasonably creditworthy borrowers. 1/ Because market interest rates vary over time, several different rates will be used including both fixed and variable rates. Interest rates can depend on other terms of the loan. The rates presented here will apply to loans of 8- to 9-year duration with downpayments of 15 percent.

The prime rate, the rate banks charge their most creditworthy customers, varied from 16 to 17 percent early in this year but declined to 13 percent on September 30, 1982. This rate is expected to continue its general decline, although the end of the recession may bring a brief increase. The fixed interest rates assumed in these calculations are 14, 15, and 16 percent. These rates are at or just above recent prime rates.

1/ Earlier in this report, specific credit terms that purchasers in each sector face were discussed.

Predicting the behavior of interest rates over the life of an 8-year contract is very difficult. The variable-rate scenarios are based on a forecast of the prime rate by Data Resources Inc. (DRI). 1/ DRI's forecast only goes as far as 1984, and the scenario calls for payments to start in the first quarter of 1982 and to end in the third quarter of 1989, so interest rates from 1985 to 1989 were projected by assuming the 8-percent annual decline in interest rates forecast in the DRI model would continue. The projected interest rates are shown in table 92. Present values are calculated at this prime rate and at this prime rate plus 1 percent. Although any prediction of an interest rate in 1989 is highly questionable, these are two plausible scenarios that indicate the value of fixed-rate export credits in a world of declining interest rates.

Export credit terms.--The Arrangement on Guidelines for Officially Supported Export Credits was adopted by 22 members of the OECD in 1978. The arrangement sets minimum interest rates for officially supported export credits; these rates depend on the wealth of the borrowing country and the term of the loan. The current arrangement rates are in table 93. The arrangement also requires that no more than 85 percent of the value of the contract be financed.

Table 92.--The actual and projected prime rate, by quarters, 1982 and 1982, and 1984-89

(In percent)

Period	Prime rate
1982: average	15.76
January-March	16.27
April-June	16.90
July-September	15.25
October-December	15.03
1983: (average)	15.33
January-March	16.02
April-June	15.29
July-September	14.87
October-December	15.15
1984	14.1
1985	13.0
1986	11.9
1987	11.0
1988	10.1
1989	9.3

Source: Before 1985, estimates are by Data Resources Inc. Other rates estimated by the staff of the U.S. International Trade Commission. These estimates are based on an 8-percent annual decline in interest rates.

1/ "Economic Outlook and Issues," July 26, 1982. The actual prime rate in October-December 1982 is far below DRI's forecast. The end of the recession may bring the prime rate up to the level predicted by DRI, or the DRI forecast may continue to be too high.

Table 93.--Minimum interest rates under the OECD arrangement for loans of varying maturities, July 5, 1982

(In percent)

Classification of borrowing country 1/	Maturity		
	2 to 5 years	5 to 8.5 years	8.5 to 10 year
Relatively rich	12.15	12.4	-
Intermediate countries	10.85	11.35	-
Countries newly graduated from poorest to intermediate:			
Effective immediately	10.5	10.75	10.75
Effective Jan. 1, 1983	10.85	11.35	11.35
Poorest countries	10	10	10

1/ A relatively rich country had a per capita Gross National Product over $4,000 in 1979. The poorest countries are those that are eligible for International Development Association assistance. These definitions were recently changed, so several countries graduated to higher categories.

Source: Economic and Monetary Affairs, July 10, 1982, No. 879, p. 1.

Official export credits may be provided at terms more favorable than those in the arrangement for several reasons. First, nations may violate the arrangement. 1/ Second, countries whose domestic commercial lending rates are below arrangement rates are allowed to charge interest rates 0.3 percent over their domestic rates without violating the arrangement. This exception primarily benefits Japan, whose prime rate on yen-denominated loans is currently around 8.25 percent, far below arrangement terms. Third, the arrangement excludes certain products, such as military equipment, agricultural commodities, ships, nuclear power plants, and aircraft.

In this section, three different interest rates on export credits will be assumed. These rates are 11.25 and 12.4 percent. The first was the interest rate the members of the OECD agreed to as a minimum rate on official export financing of 9-year loans to relatively rich countries before July 5, 1982; the second is the rate agreed to after July 5, 1982.

The effect of interest rate differences on costs.--Present values of export credits at different interest rates are shown in table 94. These present values are for hypothetical loans of $1 million each. The present

1/ The frequency of such violations is discussed on the following pages and in the export credit sections of each industry sector of this report.

value of each loan obviously depends on the total amount of money involved, but the relative difference in present values does not. If the contracts were for $10 million rather than $1 million, both present values would be multiplied by 10, but the percentage difference between them would be the same.

The effect of the interest rate on the present value of a loan depends on the other terms of the contract. For example, the larger the share of the contract required as a down payment, the less the effect of differences in the interest rate on present value. These loans each have downpayments of 15 percent and final payments that are due 8.5 years after delivery. 1/ These terms are embodied in the OECD arrangement and are also common terms for aircraft export credits and market financing.

The present value of a $1 million loan at market interest rates is $1 million. The present value is the price of the purchased equipment adjusted to reflect the value of financing concessions; if there are no financing concessions, the present value will be the price. Thus, the extent to which export credits reduce the purchasers' costs can be found by comparing their present value with $1 million, the present value of the same loan at market terms.

Export credits at the current arrangement rate can reduce the cost of an equipment purchase from 4.0 to 8.5 percent. Export credits at the old arrangement rates reduced costs from 6.8 to 11.3 percent.

1/ Each loan calls for 16 equal semiannual payments of principle plus payment of interest, with the downpayment made at delivery and the first payment made 6 months later.

Table 94.--The values of export credits under different interest rates compared with present values under market financing on a $1 million loan

Item	Assumed market rate				
	Fixed			Variable	
	14 percent	15 percent	16 percent	Prime 3/	Prime plus 1 percent
12.4 percent: 1/					
Present value	$960,212	$936,845	$914,552	$951,733	$929,141
Saving	$39,788	$63,155	$85,448	$48,267	$70,859
Saving--percent	4.0	6.3	8.5	4.8	7.1
11.25 percent: 2/					
Present value	$931,614	$908,911	$887,255	$922,837	$900,929
Saving--do	$68,386	$91,089	$112,745	$77,163	$99,071
Saving--percent	6.8	9.1	11.3	7.7	9.9

1/ The OECD arrangement's minimum interest rate for an 8.5-year export credit to a relatively rich country.

2/ The OECD arrangement's minimum interest rate for an 8.5-year export credit to a relatively rich country before July 5, 1982.

3/ As defined in table 92. Each semiannual payment is made at the interest rate in effect when the payment comes due. The first payment is made at the rate prevailing in the first quarter of 1982; the second is made at the rate prevailing in the third quarter of 1982, and so on.

Source: Estimated by the staff of the U.S. International Trade Commission.

Trends in Foreign Export Credits

The preceding section demonstrates that the effect of export credit subsidies on the cost of purchasing imports depends in large part on the difference between export credit interest rates and market interest rates. From 1977 to 1981, market interest rates rose relative to export credit rates, and this trend may have increased the significance of export credits. Recently U.S. interest rates have been falling, and the OECD arrangement has increased export credit interest rates. If market interest rates continue to fall relative to export credit rates, the significance of export credits may decrease. Export credit interest rates of France, West Germany, Japan, and the United Kingdom from 1978 to 1981 are shown in table 95. Data on interest rates of Government bonds are also presented to indicate trends in interest rates in these countries. 1/ As can be seen, for each of these four

1/ Because private firms generally cannot borrow at the government bond rate, the difference between the government bond rates and foreign export credit rates does not measure the value of an export credit to a purchaser. Furthermore, because the interest rates in table 95 are for loans in each country's own currency, the rates charged by different countries cannot be directly compared.

Table 95.--Long-term interest rates of selected foreign export credit agencies and the Government bond rates in those countries, 1978-81

(In percent)

Item	France		West Germany		Japan		United Kingdom	
	Export credit rate	Government bond rate	Export credit rate	Government bond rate	Export credit rate	Government bond rate	Export credit rate	Government bond rate
1978	8.35	8.96	8.70	1/	8.00	6.09	8.10	12.47
1979	8.35	9.48	8.90	7.4	7.85	7.69	8.10	12.99
1980	8.45	12.99	9.05	8.5	7.65	9.22	8.19	13.79
1981	8.55	15.66	9.55	10.4	7.94	8.66	8.79	14.75
Change	2.40	74.78	7.30	40.54	-.75	42.20	8.52	18.28

1/ Not available. Changes in both West German interest rates are calculated using 1979 as a base.

Source: Official statistics of the U.S. Export-Import Bank; 1978 Government bond rates, compiled from Moody's International Manual 1981.

countries, export credit rates rose much less quickly than the bond interest rate. The two countries with the smallest increase in the export credit rate, France and Japan, had the largest increase in the Government bond rate. In France, the export credit rate rose by 2.40 percent; the Government bond rate rose 74.78 percent. In Japan, the export credit rate fell by 0.75 percent; the Government bond rate rose by 42.20 percent.

Recently, however, interest rates in most industrial countries have been declining. Furthermore, changes in the OECD arrangement may significantly increase interest rates on export credits. Since October 1981, the minimum arrangement rate has increased by 3.65 percentage points. 1/

The OECD arrangement rate is compared with the U.S. prime rate just before and just after each revision in the arrangement in table 96. When the arrangement came into effect on April 1, 1978, the arrangement rate and the prime rate were equal. From April 1978 until October 1981, the arrangement rate increased only slightly, and the prime rate soared. On October 1, 1981, the prime rate was 9.75 percentage points above the arrangement rate. Since then, the arrangement rate has increased twice, and prime rates have generally declined. On September 30, 1982, the prime rate was 0.6 percentage points above the arrangement rate.

1/ This figure refers to the rate for credits of 5 to 8.5 years in duration to purchasers in relatively rich countries. Other rates increased by different amounts. Information available on export credits received by U.S. purchasers indicate that they are generally for more than 5 years.

Table 96.--The OECD arrangement rate on credits of 5 to 8.5 years in duration to relatively rich countries, and the prime rate, by specified dates, Jan. 1, 1977-Sept. 30, 1982

(In percent)

Date	Arrangement rate	Prime rate	Difference
Jan. 1, 1977 1/	8.00	6.25	-1.75
Apr. 1, 1978	8.00	8.00	-
June 1, 1980	8.00	11.50	3.50
July 1, 1980	8.75	11.00	2.25
Oct. 1, 1981	8.75	18.00	9.25
Nov. 17, 1981	11.25	16.00	4.75
June 1, 1982	11.25	16.50	5.25
July 6, 1982	12.40	15.50	3.10
Sept. 30, 1982	12.40	13.00	.60

1/ The OECD arrangement became effective on Apr. 1, 1978. The arrangement rate shown for Jan. 1, 1977, is from the OECD Consensus on Export Credits.

Source: Arrangement Rates, compiled from official statistics of the OECD; prime rates, compiled from Morgan Guaranty Trust Co., World Financial Markets, various issues.

Derogations from the arrangement.--Changes in the terms of the OECD arrangement will increase interest rates only if countries actually use these terms. In the past, countries generally have followed the arrangement. 1/ In the first 10.5 months of 1982, there were eight known violations of the arrangement that involved a foreign export credit that financed a U.S. import. Only one of these eight violations involved a product included in this study. This violation involved a loan from the Export Development Corporation of Canada to finance the purchase of subway cars. 2/

Recent changes in the arrangement may make derogations less common. Countries had been allowed to violate the arrangement's terms if they notified other signatories of the violation. After October 15, 1982, these violations were no longer allowed.

1/ John M. Duff, Senior Vice President of the U.S. Export Import Bank, states that the arrangement is rarely violated. See "The Outlook for Official Export Credits," Law and Policy in International Business, vol. 13, No. 4, 1981, p. 907.

Export credit agencies of countries that have signed the arrangement are supposed to notify each other every time they derogate from the arrangement. From Jan. 1 to Nov. 11, 1982, the U.S. Exim Bank was notified of 17 actual or potential derogations involving credits on U.S. imports. The Commission staff has reviewed the files on these derogations and found that in nine cases either the product involved was not covered by the arrangement or a credit that would violate the arrangement apparently was discussed but not actually granted.

2/ This loan is fully discussed in app. J.

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APPENDIX A

A LISTING OF AIRCRAFT MODELS CURRENTLY IN SERVICE IN 1981 AND NEW MODELS UNDER DEVELOPMENT

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Table A1.—Commuter aircraft in production, 1982

Aircraft	Manufacturer	Country	Number of seats	1981 price 1/
Cessna 402	Cessna	United States	8	$333,606
Navajo Chieftan	Piper	do	8	$377,620
Islander (BN-2)	Pilatus Britten-Norman.	Switzerland	8	$301,930
T-1020	Piper	United States	9	$370,000
T-1040	do	do	9	$700,000
404 Titan	Cessna	do	10	$478,910
Nomad 22B	Government Aircraft Factories.	Australia	13	2/
Heron 3/	de Havilland	Canada	14	2/
C99	Beech	United States	15	$1,335,000
Nomad 24A	Government Aircraft Factories.	Australia	16	$1,196,308
Trislander	Pilatus Britten-Norman.	Switzerland	17	$514,120
Jetstream 3/	British Aerospace	United Kingdom	17	2/
Bandeirante	Embraer	Brazil	18	$1,495,998
Metro	Fairchild Swearingen Swearingen.	United States	19	$1,845,000
Twin Otter	de Havilland	Canada	19	$1,170,000
Arava	Israel Aircraft Industries.	Israel	19	$1,650,000
Nord 262 3/	Aerospatiale	France	27	2/
C-212	Casa	Spain	27	$2,121,700
SD 3-30	Short Brothers	N. Ireland	30	$2,870,000
G-1C	Gulfstream	United States	32	$3,000,000
580/600 3/	Convair	do	44	2/
Martin 404 3/	Martin	do	44	2/
Dash 7	de Havilland	Canada	50	$5,020,000
BAe 748	British Aerospace	United Kingdom	50	$6,500,000
F-27	Fokker	Netherlands	50	$6,350,000
YS-11 3/	Nihon	Japan	60	2/

1/ In current U.S. dollars.
2/ Not available.
3/ No longer in production.

Source: Regional Airline Association, 1981 Annual Report, Regional/Commuter Airline Industry, February 1982.

Table A2.--Commuter aircraft under development, 1982

Aircraft	Manufacturer	Country	Number of seats	Year available	1981 price 1/
228-100	Dornier	West Germany	15	1982	2/
228-200	do	do	19	1982	$1,600,000
Jetstream 31	British Aerospace.	United Kingdom.	19	1982	$2,200,000
1900	Beech	United States.	19	1983	$1,600,000
Ahrens 404 3/	Ahrens Aircraft Aircraft.	do	30	1982	$1,800,000
Brasilia	Embraer	Brazil	30	1985	$3,200,000
SF 340	Saab/Fairchild	Sweden/United States.	34	1984	$3,750,000
Shorts 360	Short Brothers	Northern Ireland.	36	1982	$3,250,000
Dash	de Havilland	Canada	36	1984	$3,925,000
CN-235	Casa/Nutranio	Spain/ Indonesia.	38	1984	$3,850,000
ATR 42	Aerospatiale/ Aeritalia.	France/Italy	42-49	1985	$5,000,000
CAC	Commuter Aircraft Corp.	United States	50	1984	$5,000,000

1/ In current U.S. dollars.
2/ Not available.
3/ Company currently in bankruptcy proceedings.

Source: Regional Airline Association, 1981 Annual Report, Regional/Commuter Airline Industry, February 1982.

Table A3.—Medium- and large-transport aircraft in production, 1982

Aircraft model	Type	Manufacturer	Typical number of seats	Engines	Approximate range	Initial date in service
					Miles	
BAe 146	Standard body.	British Aerospace.	82	RR 1/	2/	1983
F-28	do	Fokker	85	RR	900	1969
DC-9-30	do	McDonnell Douglas.	93	PW 3/	2,000	1965
737-200	do	Boeing	100	PW	2,100	1967
DC-9-80	do	McDonnell Douglas.	137	PW	2,300	1980
727-200	do	Boeing	145	PW	2,500	1964
707-320B	do	do	147	PW	5,800	1958
757	do	do	178	RR, 3/ PW	3,500	1983
767	Wide body.	do	208	GE, 4/ PW	3,400	1982
A310	do	Airbus Industrie.	212	GE, PW	3,100	1983
DC-8-71	Standard body.	McDonnell Douglas.	220	CFM1 5/	4,600	1982
L-1011-500	Wide body.	Lockheed	246	RR	5,000	1979
L-1011-1	do	do	256	RR	3,700	1972
A-300-600	do	Airbus Industrie	263	GE, PW	3,700	2/
DC-10-10/15	do	McDonnell Douglas.	277	GE	3,700	1972
DC-10-30/40	do	do	277	GE, PW	5,400	1972
747 SP 6/	do	Boeing	321	PW, GE, RR	5,800	1976
747, 200B	do	do	442	PW, GE, RR	6,000	1970
747-SUD 7/	do	do	486	PW, GE, RR	6,200	1984
747 SR 8/	do	do	500	PW, GE	3,000	1973

1/ Rolls Royce.
2/ Not available.
3/ Pratt Whitney.
4/ General Electric.
5/ Partnership between General Electric and SNEMCA of France.
6/ Special performance.
7/ Stretched upper deck.
8/ Short range.

Source: Aerospace Industries Association, The Challenge of Foreign Competition, To the U.S. Jet Transport Manufacturing Industry, December 1981.

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Table A4.--Medium- and large-transport aircraft planned or under development, 1982

Aircraft model	Type	Manufacturer	Typical number of seats	Engines	Range miles	Expected date in service
7-7----------	Standard body.	Boeing-------	150	CFMI, RR, PW	1,500	late 1980's
MDF-100 1/---	----do---	McDonnell Douglas/ Fokker.	150	CFMI, RR, PW	2,200	mid 1980's
A-320--------	----do---	Airbus Industrie.	150	CFMI, RR, PW	1,800	mid 1980's
TA-11--------	Wide body	Airbus Industrie.	226	PW	6,100	mid 1980's
TA-12--------	----do---	Airbus Industrie.	226	GE, PW	5,120	mid 1980's
DC-10 Super 10---	----do---	McDonnell Douglas.	277	PW, GE, RR	4,500	mid 1980's
TA-9---------	----do---	Airbus Industrie.	323	GE, PW	3,200	mid 1980's
DC-10 Super 30---	----do----	McDonnell Douglas.	327	GE, PW	5,300	mid 1980's
747 Stretch----	----do----	Boeing-------	over 500	PW, GE, RR	5,500	mid 1980's

1/ Joint venture terminated in February 1982, but sources at McDonnell Douglas indicate that the company is continuing to explore joint venture possibilities with potential partners.

Source: Aerospace Industries Association, December 1981, The Challenge of Foreign Competition, To the U.S. Jet Transport Manufacturing Industry.

Table A5.—Civil helicopters in production, 1982

Model	Manufacturer	Country	Class	Number of passengers	Useful load	Range with useful load
					In pounds	Nautical miles
SA 316B Alouette 3.	Aerospatiale	France	Light	7	2,306	267
SA 319B	do	do	do	7	2,413	340
SA 315B Lama.	do	do	do	5	2,759	278
SA 342J Gazelle.	do	do	do	5	2,011	407
SA 361H Dauphin.	do	do	Intermediate	14	3,889	297
SA 365N Dauphin 2	do	do	do	14	4,066	476
AS 350D AStar.	do	do	do	6	1,933	412
AS 332C	do	do	1/	21	9,290	343
AS 355F Twin Star.	do	do	Light	6	2,231	402
AS 350B Ecureuil.	do	do	do	6	1,933	378
109A	Agusta	Italy	1/	8	2,402	385
206B Jet-ranger III.	Bell	United States.	Light	5	1,565	348
206L-1	do	do	do	7	1,947	297
206L-3	do	do	do	7	1,925	305
212	do	do	Intermediate.	15	5,238	226
214ST	do	do	Medium	18	8,035	435
222	do	do	Intermediate.	7 to 10	2,985	356
412	do	do	do	15	5,333	232
234 Chinook (LR).	Boeing Vertol.	United States.	Heavy	47	23,300	620
234 Chinook (UT).	do	do	do	3	30,000	264
B-2B	Bryantly-Hynes.	do	Light	2	670	225
305	do	do	do	5	1,200	275
280C	Enstrom	do	do	3	850	243
F-28C-2	do	do	do	3	850	243
F-28F	do	do	do	3	800	238
280F	do	do	do	3	800	247
UH-12ET	Hiller	do	do	3	1,450	351
UH-12E4T	do	do	do	4	1,450	351
300C(269C)	Hughes	do	do	3	1,004	224
500D(369D)	do	do	do	5	1,660	287
500E(369E)	do	do	do	5-7	1,586	287
530	do	do	do	5-7	1,589	234

Table A5.—Civil helicopters in production, 1982—Continued

Model	Manufacturer	Country	Class	Number of passengers	Useful load	Range with useful load
					In pounds	Nautical miles
BO 105 CB	MBB	Germany	Light	5	2,684	310
BO 105 CBS	do	do	do	5-6	2,637	310
BO 105 DB/ DBS.	do	do	do	5-6	2,514	310
BO 105 LS	do	do	do	5-6	2,800	290
BK 117	MBB/Kawasaki	Germany/ Japan.	Intermediate.	8-11	2,778	294
R22	Robinson	United States.	Light	2	468	208
S-76 Mark II	Sikorsky	United States.	Intermediate.	14	4,525	466
Westland 30	Westland	England	do	19	equivalent of 17 passengers	70-130

1/ Not available.

Source: Aerospace Industries Association, Directory of VTOL Aircraft, 1982, 1982.

APPENDIX B

AN ANALYSIS OF U.S.-BASED AIRCRAFT MANUFACTURERS

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Commuter aircraft

Beech Aircraft Corp.--Beech Aircraft Corp. was founded in 1932 as a private firm; however, in 1980, Beech became a wholly owned subsidiary of the Raytheon Corp. The firm continues to be operated as a separate entity under its former management at its original locations, but representatives of Raytheon sit on the board of directors. Beech Aircraft Corp., according to company officials, is currently engaged in the production of civil and military aircraft, missle targets, aircraft and missle components, and cryogenic equipment for spacecraft. 1/ The company presently markets two basic models of aircraft utilized by commuter carriers: the C99 and the 1900 15- and 19-seat aircraft, respectively. The former is a nonpressurized aircraft; the later is pressurized. Earlier versions of the Beech 99 aircraft established the firm as a major supplier of 19-passenger commuter aircraft; however, they face strong competition from both foreign and domestic manufacturers. Beech seems to have focused its attention on new aircraft to defend its traditional market through the introduction of the 1900. However, like Cessna and Piper, a large portion of their product line is small aircraft for other uses. Beech occupies 3.4 million square feet of plant area at its five major facilities in Wichita, Liberal, and Salina, Kans.; Boulder, Colo.; and Selma, Ala. The Salina division supplies all wings used for commuter planes; nose, tail and control surfaces are made in Liberal, Kans. Detailed parts for commuter planes are manufactured in Wichita. Final assembly of the C99 airplane is in Selma, Ala., and the 1900 is to be assembled in Wichita, Kans. 2/

Cessna Aircraft Co.--Cessna Aircraft Co. was founded in 1911 and incorporated on September 7, 1927. It is an independent company which manufactures a variety of smaller aircraft. The company has four plants in Wichita, Kans., engaged in the production of commercial and military aircraft. Two models of Cessna-built planes are marketed as commuter aircraft: the Cessna 402 and the 404 Titan. The firm's traditional markets are for small general aviation and corporate aircraft. Cessna appears to be concentrating its focus on noncommuter markets, but is currently selling to small commuter carriers. Capital expenditures by the company involving aircraft amounted to $17.1 million in 1981. Employment figures are not available. Net earnings for Cessna's aircraft operations in 1981 totaled $60.6 million. According to industry officials, for the 9-month period ending June 30, 1982, the company had a 3.7-percent return on assets. 3/ * * *. 4/

Fairchild Aircraft Corp.--Fairchild Aircraft Corp. (formerly Fairchild Swearingen) was formed in 1972, and is a wholly owned subsidiary of Fairchild Industries, Inc. At their production facilities in San Antonio, Tex., Fairchild Swearingen currently manufactures the Metro III, a pressurized,

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1/ Jane's All The World's Aircraft, 1981-82, p. 277.

2/ Ibid.

3/ Telephone conversation with officials of the General Aviation Manufacturers Association, Aug. 30, 1982.

4/ Data submitted in response to questionnaires of the U.S. International Trade Commission.

commuter aircraft. Fairchild is the leading domestic producer of 19-passenger turboprop commuter aircraft and is pursuing an aggressive marketing program in this market segment. 1/ The company entered into a joint-venture agreement in January 1980 with Saab Scandia A.B. of Sweden to develop and manufacture the SAAB/Fairchild 340 commuter airplane. The agreement calls for the two firms to share equally all costs associated with development of this aircraft. The majority of the component parts for this airplane will be manufactured by divisions of the parent firm in Republic, N.Y., and Hagerstown, Md. Final assembly is scheduled to be completed in Sweden. Additionally, Fairchild manufactures an executive airplane version of its commuter plane called the Merlin. Total operating losses for the commercial aerospace division of Fairchild Industries (which includes production of commuter and executive aircraft, subcontracts, and manufacture of airline seats) amounted to $28.1 million in 1981. The operating losses in this segment of Fairchild Industries center on the costs of several new commercial aircraft. The company elected to expense the engineering costs associated with the development of the SAAB/Fairchild 340 aircraft. In 1981, these expenses amounted to $12 million. Additionally, the company completed design and certification of a derivation of their existing commuter aircraft. 2/

Gulfstream American Corp.--Gulfstream American Corp. (Savannah, Ga.), originally a division of Grumman Corp., was purchased from Grumman in 1978 and has since operated as a wholly independent company. The firm's principal output is the G-3 executive airplane. However, Gulfstream American is currently involved in a program to convert one of its executive turboprop airplanes into a commuter aircraft. Due to a strong demand for corporate aircraft, Gulfstream American has subcontracted with Haze International (Birmingham, Ala.) to perform the necessary airplane modifications. Capital expenditures by the firm in all aerospace operations amounted to $45.9 million in 1981, representing an increase of 63.9 percent over the 1980 amount of $28.0 million. Net income for the firm amounted to $12.4 million in 1981. 3/ For the period January through June 1982, Gulfstream American had a return on assets of * * * percent. 4/

Piper Aircraft Corp.--Piper Aircraft Corp., located in Lock Haven, Pa., was originally incorporated in 1937. In 1978, the firm became a wholly owned subsidiary of the Bangor Punta Corp. Piper has traditionally specialized in the production of small (8- to 10-passenger) commuter aircraft. The Navajo Chieftan, T-1020, and T-1040 are the three planes that are manufactured for this market. The company also markets a number of general aviation aircraft

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1/ Analyses of the Business Prospects of the CAC-100 Commuter Aircraft Program and the Commuter Aircraft Strategies of Major U.S. Manufacturers, ICF Inc., June 28, 1982, p. 21.

2/ Fairchild Industries Inc. Annual Report 1981, pp. 13 and 14.

3/ Gulfstream Aerospace Corporation and Subsidiaries Annual Report, 1981, pp. 12-14.

4/ Telephone conversation with officials of the General Aviation Manufacturers Association, Aug. 30, 1982.

for personal and corporate use. Piper employed approximately 6,328 employees in 1981, representing a decline of 7.8 percent from the 1980 total of 6,867 workers. Capital expenditures in 1981 amounted to $5.1 million. In 1980, these expenditures totaled $15.5 million. The firm's operating profit reached $17.6 million on $409.5 million in sales in 1981. The profit margin was 4.3 percent in 1981 compared with 6.7 percent in 1980. 1/ Piper aircraft has a Swiss subsidiary named Piper Aircraft International. The firm also has license arrangements with Embraer of Brazil, Aero Mercantile of Colombia, Chincul of Argentina, and Aero Salfa of Chile. 2/

Medium- and large-transport aircraft

The Boeing Co.--In May 1961, the Boeing Airplane Co. changed its name to The Boeing Co. reflecting its diversified interests. In 1972, the firm announced that three of its operating organizations had been designated as companies: Boeing Commercial Airplane Co., Renton, Wash.; Boeing Aerospace Co., Kent, Wash.; and Boeing Vertol Co., Philadelphia, Pa. The Boeing Commercial Airplane Company is currently the world's leading manufacturer of commercial aircraft. The company is organized into five divisions: 707/727/737 Division (Renton), 747, Division (Everett), 767 Division (Everett), 757 Division (Renton), and the Fabrication Division, which serves all of the above operating groups. A separate engineering organization, which reports to the company headquarters, is responsible for such functions as technology, quality control, and flight operations. Boeing Aerospace Co. is responsible for much of the firm's military, space, and diversification efforts. Boeing Vertol Co. is a producer of civil and military helicopters. Additionally, Boeing is involved in computer and marine activities. 3/

Boeing currently markets five models of commercial aircraft: the 727, 737, 747, 757, and 767. There have been numerous derivations of the basic models of the 727, 737, and 747 airplanes. Additionally, Boeing has done preliminary design work on a 150-seat jet transport currently designated the 7-7. Announced commercial airplane orders for 1981 totaled 224 units compared with 361 in the previous year. The value of new orders was $6.1 billion in 1981 compared to $10.3 billion in 1980. 4/ Employment figures for the commercial aircraft division are not currently available.

In 1981, the Boeing Co.'s net earnings for all divisions totalej $473.0 million, representing a decrease of 21.2 percent from the 1980 total of $600.5 million. The decline in net earnings was attributed to several reasons. According to industry sources, the company spent over $3 billion to develop two new planes--the 757 and 767. 5/ Additionally, there was a decline in airplane deliveries, a loss in progress payments from airline customers canceling or postponing orders, and heavy financing costs on undelivered airplanes. Boeing currently faces possible cancellation of $5 billion in

1/ Bangor Punta Corporation Annual Report, 1981, p. 6.
2/ Jane's All The World's Aircraft, 1981-82, p. 277.
3/ Ibid., pp. 304-317.
4/ Boeing 1981 Annual Report, p. 1.
5/ Ibid.

orders from the ailing airline industry due to high interest rates and large losses in earnings. 1/ Boeing's net earnings showed a sharp drop from $377 million in January-September 1981 to $201 million in the corresponding period of 1982. January-March 1982 sales dropped to $2.0 billion from $2.2 billion in the corresponding period of 1981. 2/ The firm's worldwide market share decreased to 56 percent in 1981 compared with 63 percent in 1980. 3/

Lockheed Corp.--Lockheed Aircraft Co. was formed in 1926 in Burbank, Calif. by Allan and Malcolm Lockheed. The firm was reorganized as Lockheed Aircraft Corp. in 1932. In September 1977, the title Lockheed Aircraft Corp. was changed to Lockheed Corp. to reflect the company's diversified interests. In addition to its military and civil aircraft operations, Lockheed has interests in shipbuilding, heavy construction, and electronics. 4/

Lockheed's aircraft and missile operations are handled by the Lockheed-California Co., Burbank, Calif., and the Lockheed-Georgia Co., Marietta, Ga. The Lockheed L-100 series commercial Hercules is a cargo aircraft and is manufactured by Lockheed-Georgia Co. Production of the firm's only large transport (L-1011 series) is by Lockheed-California Co. Lockheed received 2 L-1011 orders in 1982, and a backlog of 21 aircraft remains for delivery in 1982-84. 4/ However, in 1982, Lockheed announced that production of the L-1011 commercial jetliner will be phased out by early 1984. However, product support and spare parts activities will continue. 5/

Program profits for total aircraft and related services operations for Lockheed amounted to $216 million in 1981 compared with $163 million in 1980. Lockheed reported earnings of $37.5 million on sales of $1.1 billion in 1982 compared with $30.1 million on the same level of sales in 1981. 6/ The firm employed 7,300 persons in all of its operations in January-March 1981. Lockheeds's worldwide market share of the commercial aircraft market declined from 8 percent in 1980 to 5 percent in 1981. 7/

1/ "Boeing Tries to Manuevers Out of Downdraft," Business Week, Apr. 26, 1982, p. 97.

2/ "Boeing Has Lower Third-Quarter Earnings," Aviation Week and Space Technology, Nov. 8, 1982, p. 21.

3/ Richard G. O'Lone, "Economy Key to Long Term Outlook," Aviation Week and Space Technology, Mar. 8, 1982, p. 163.

4/ Jane's All the World Aircraft 1981-82, pp. 389-395.

5/ "Heavy Losses Cited in Decision to Cease L-1011 Production, Aviation Week and Space Technology, Dec. 14, 1981 and Lockheed Corporation, Fiftieth Annual Report to Stockholders, 1981.

6/ "New Order Dips Threatens Airframe Makers Future," Aviation Week and Space Technology, May 17, 1982, p. 16.

7/ Op. cit., Aviation Week and Space Technology, Mar. 8, 1982.

McDonnell Douglas Corp.--McDonnell Douglas Corp. was formed on April 28, 1967, by the merger of the former Douglas Aircraft Co., Inc. and McDonnell. It encompasses both of the original companies and their subsidiaries. Major operating components of McDonnell Douglas Corp. include Douglas Aircraft Co. (commercial aircraft), McDonnell Douglas Astronautics Co. (missiles and spacecraft), McDonnell Aircraft Co. (military aircraft), McDonnell Douglas Automation Co. (data processing), McDonnell Douglas Electronics Co. and McDonnell Douglas-Tulsa. 1/

Douglas Aircraft Co. operates plants at Long Beach, Palmdale, and Torrance, Calif. The firm produces various models of DC9 and DC10 large-transport aircraft. 2/ New orders for aircraft produced by the firm totaled 20 in 1981 (3 for DC10 and 17 for DC9). Additionally, the company entered into an agreement with Fokker of the Netherlands under which the two companies began working together to design and explore possible production of a new aircraft, designated the MDF100, in the 150-passenger class. The agreement was terminated in February 1982, but according to corporate officials, McDonnells Douglas is continuing work on an aircraft of this type. 3/

In 1981, the commericial aircraft division of McDonnell Douglas lost a total of $85.0 million, representing an improvement of 41.1 percent from the $144.3 million loss in 1980. 4/ Data regarding employment in commercial aircraft operation are not currently available. McDonnell Douglas' worldwide market share declined to 8 percent in 1981 from 9 percent in 1980. 5/

Helicopters

Bell.--Bell Helicopter Textron is a division of Textron, Inc. The firm employed approximately 9,000 people at its Fort Worth, Tex. facilities in 1981. Bell produces three civil and numerous models of military helicopters. Additionally, several of its models are built under license by Agusta in Italy and Fuji in Japan. 6/

Boeing Vertol.--Boeing Vertol is a division of the Boeing Co. The Boeing Co., as a recognition of its diversified interests, changed its name from the Boeing Airplane Co. in May 1961. On December 19, 1972, it was announced that three of the company's operating organizations had been designated as companies--Boeing Commercial Airplane Co. (Renton, Wash.), Boeing Aerospace Co. (Kent, Wash.) and Boeing Vertol Co. (Philadelphia, Pa.). Boeing Vertol was originally established in 1960. The firm currently produces two civil and

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1/ Jane's all the World Aircraft 1981-82, p. 389-395.
2/ Ibid., p. 407.
3/ 1981 Annual Report, McDonnell Douglas Corporation, December 31, 1981.
4/ Ibid.
5/ Richard G. O'Lone, "Economy Key to Long Term Outlook," Aviation Week and Space Technology, March 8, 1982, p. 163.
6/ Jane's All the World Aircraft, 1981-82, p. 293.

numerous models of military tandem-rotor helicopters, concentrating on medium and heavy class models. 1/

Bryantly-Hynes.--Bryantly-Hynes, formed on January 1, 1975, replaced Bryantly Operators, Inc., which acquired all rights in Bryantly Helicopters in late 1970. The firm's production facilties are located in Frederick, Okla. 2/ According to industry sources, the firm has not delivered any civil helicopters since 1979.

Enstrom.--The company, originally called the R. J. Enstrom Corp., began to build helicopters in 1959. The firm was acquired by the Purex Corp. in October 1968 and was operated for a short time as part of the Pacific Airmotive Aerospace Group. The activities of this group ended in February 1970, but in January 1971, the Purex shares were acquired by a private investor. In January 1980, these shares were purchased by Bravo Investments, B.V., of the Netherlands, which is now the owner of Enstrom. A total of 715 Enstrom helicoptrs had been built at the Menominee, Mich. facility by 1981. 3/ There are 4 models of civil helicopters currently manufactured by Enstrom.

Hiller.--Hiller Aviation, formed in January 1973, acquired from Fairchild Industries the design rights, production, tooling, and spares of the Hiller 12E piston-engine light helicopter. Initially, the company provided only product support for UH-12 helicopters in service throughout the world, a total then estimated as being in excess of 2,200 rotorcraft. Service and repair facilities were added as a first move to expand the company's helicopter business. It was then decided to begin the manufacture of new helicopters from existing components incorporating all modifications approved for the type since closure of the production line in the late 1960's. The firm currently manufactures four models of civil helicopters. 4/

Hughes.--Following reorganization of Hughes Tool Co. as the Summa Corp., its former aircraft division became known as Hughes Helicopters. It has now separated from the Summa Corp. and is a wholly owned subsidiary of the Hughes Corp. with production facilities located in Culver City, Calif. In 1981, nearly 4,500 Hughes helicopters were serving with civil and military operators in more than 100 countries worldwide, with production continuing on a series of advanced models. License manufacture of Hughes helicopters is undertaken by RACA in Argentina, Kawasaki in Japan, KAL in the Republic of Korea, and Breda Nardi in Italy. 5/ There are two civil helicopter models currently manufactured by the firm.

Robinson.--Robinson Helicopter Corp. was formed to design and manufacture a lightweight helicopter which could be competitive in price with current 2- and 4-seat fixed-wing aircraft. The design of the helicopter began in 1973, and the first prototype flew on August 28, 1975. Orders for a total of over

1/ Jane's All the World Aircraft, 1981-82, p. 322.
2/ Ibid., p. 349.
3/ Ibid, p. 322.
4/ Ibid., p. 379.
5/ Ibid., p. 379.

800 R22's had been received by 1981. Deliveries began in October 1979 and had exceeded 180 by mid-1981; the production rate was then approximately 5 aircraft per week. Production at the firms Torrance, Calif. plant was expected to increase to two R22's per working day by the end of 1981. 1/ Currently, the firm produces only one model of civil helicopter.

Sikorsky.—Sikorsky was founded on March 5, 1923, by Igor I. Sikorsky as the Sikorsky Aero Engine Corp. The company has been a division of United Technolgies since 1929. Its main plant at Stratford, Conn., is 1.3 million square feet and produces a variety of civil and military helicopters. Licensees of the firm's products include Westland of the United Kingdom, Agusta of Italy, Aerospatiale of France, MBB of West Germany, Mitsubishi of Japan, and Pratt and Whitney Aircraft of Canada, Ltd. 2/ Additionally, industry sources indicate that Sikorsky is currently seeking partners for production and development of helicopters. The firm is said to be considering not only short-term cooperative efforts, but also long-term collateral development of new models. 3/ Sikorsky currently manufactures one civil helicopter model, the S-76.

1/ Jane's All the World Aircraft, 1981-82, p. 451.
2/ Ibid., p. 458.
3/ Helicopter News, May 24, 1982, p. 88.

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APPENDIX C

AN ANALYSIS OF FOREIGN MANUFACTURERS OF AIRCRAFT

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Commuter aircraft

Aeritalia.--Societa Aerospaziate Italiana (Aeritalia) is a joint stock company which was formed on November 12, 1969, by an equal shareholding of FIAT and IRI-Finmeccanica to combine the two firm's aerospace activities. The company became fully operational in 1972. Aeritalia is a Government-owned company. In 1976, IRI-Finmeccanico purchased the Aeritalia stock owned by Fiat, thus acquiring complete control of the company's stock capital. In addition to its partnership with Aerospatiale of France in the ATR 42 commuter aircraft program, Aeritalia is working with Embraer of Brazil on production of military aircraft. The firm is also responsible for designing and manufacturing components for a major U.S. aircraft company. Aeritalia absorbed Partenavia, in which Aeritalia had held a major shareholding for several years, during 1981. This acquisition opens new prospects for the company in the field of commuter aircraft, because Partenavia has in its plans two twin turboprops in the 14- and 19-seat ranges. Aeritalia had a total work force of approximately 12,000 people in 1981. In 1981, the firm achieved sales of * * * million and a profit of approximately * * * million. New orders for military and civil aircraft totaled * * * million and $117 million, respectively. Aeritalia's new investments amounted to * * * million in 1981. 1/

Aerospatiale.--The Societe Nationale Industrielle Aerospatiale (Aerospatiale) was formed on January 1, 1970, by a decision of the French Government as a result of the merger of Sud-Aviation, Nord-Aviation and SERES companies. It is the largest aerospace company in the Common Market countries on the European continent, with a registered capital of 447.4 million francs. Aerospatiale is owned by the Government of France. In addition to its commuter aircraft operations, Aerospatiale produces military trainers, large transports (as a participant in the Airbus Industries Consortium), helicopters, guided missles, spacecraft, and research rockets. Aircraft facilities extend over a total area of 105.4 million square feet, and the operations employed a staff (including subsidiary companies) of 38,200 workers in 1980. 2/ Profitability figures are not available. Under France's 1983 Transportation Ministry budget, $405 million has been allocated for the country's civil aviation programs. This figure includes funding of $31.8 million specifically provided for Aerospatiale's new commuter aircraft. 3/

British Aerospace.--British Aerospace Public Ltd. Co. (British Aerospace) of the United Kingdom was established by the Aircraft and Shipbuilding Industries Act of 1977, as a result of which, on April 29, 1977, the ownership of four separate companies was vested in the corporation. Initially, the four firms continued to trade under their existing names; however, as of 1978, a new structure for British Aerospace was implemented whereby the corporation

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1/ * * *.

2/ Jane's All the World Aircraft 1981-81, p. 44. Data are last data available.

3/ "French Propose $405 million for Civil Aviation," Aviation Week and Space Technology, Oct. 4, 1982, p. 32.

functioned through two operating groups: Aircraft and Dynamics. Currently, the ownership of British Aerospace is structured as follows: The British Government, 48.43 percent; shareholders, 48.43 percent; and employees, 3.14 percent. There were approximately 60,000 people employed in aircraft operations in 1981. The company is currently manufacturing a 50-seat commuter airplane (748) and has begun work on a new version of an existing commuter plane (Jetstream 31). The firm is also a major participant in Airbus Industries and a builder of medium transports. British Aerospace employed approximately 79,000 workers in 1981. 1/

CASA.--Construcciones Aeronautics SA (CASA) of Spain, has manufactured transport aircraft since 1923. It is one of Europe's largest aerospace companies with engine and space divisions, and a staff of 8,300. The firm's major activity is the manufacture of airframes and components, with work for foreign customers predominating. Restructuring of the company took place in 1977 when CASA was combined with the Hispano Aviacion SA, and again in 1973 with Empresa Nacional de Motores de Aviacion. The former had manufactured 13 different aircraft types, and the latter had built and delivered aircraft engines. In recent years, the main products of CASA have been their commuter airplane and an advanced turbofan military trainer. Additionally, the firm is a participant in the Airbus Industries Consortium and a supplier of large-transport components to the United States. CASA also performs overhaul and maintenance work on Spanish army aircraft and helicopters. The firm currently operates major facilities at Getafe, Ajaluir, Cadiz, and Seville. The commuter aircraft produced by this Spanish firm are manufactured at the Seville facility, with corporate offices located in Madrid. CASA is controlled by the Spanish Government through the Instituto National de Industrio, which holds 69.5 percent of the present capital of $22 million. Northrop of the United States has a 13.3-percent holding, and Germany's MBB, 11 percent. Of the remaining 6.2 percent, 5 percent is in the hands of two Spanish banks. The 1981 profit for CASA is estimated to have been $5 million, or 60 percent above the 1980 figure. Sales volume in 1981 is estimated to have amounted to $250 million (up 45 percent from 1980 figures), and export sales, to $162 million (up 85 percent from 1980 figures). 2/

de Havilland.--The de Havilland Aircraft of Canada Ltd. (de Havilland) was established in early 1928 as a subsidiary of the de Havilland Aircraft Co. Ltd. On June 26, 1974, ownership was transferred to the Canadian Government, which planned to operate the company only until responsible Canadian investors were found to purchase and operate the company. The Canadian Government now owns all but one share of de Havilland stock. 3/ The company currently manufactures two turboprop commuter aircraft (Twin Otter and Dash 7) and is in the process of developing a turboprop commuter airplane with 32 to 36 seats (Dash 8). In 1981, de Havilland facilities covered a total area of 1.2 million square feet at Downsview for manufacturing, engineering, and marketing departments. Approximately 4,700 people were employed in 1981. 4/

1/ Jane's All the World Aircraft, 1981-82, pp. 235 and 236.

2/ Anthony Vandyk, "Market-Wise CASA Links Future to Burgeoning commuters," Commuter Air, June 1982, pp. 23 and 24.

3/ "Canada Provides $500 million in Loan Guarantees for Dash 8," Aviation Week and Space Technology, Feb. 9, 1981.

4/ Jane's All the World Aircraft, 1981-82, p. 22.

Dornier GmbH.--Dornier GmbH, formerly Dornier-Metallbauten, was formed in 1922 as the successor to the "Do" division of the former Zeppelin Werke, Lindau, GmbH. In 1981, Dornier employed approximately 8,500 persons--43 percent as production workers, 32 percent in research and development; and 25 percent, in technical and logistic support. The firm manufactures utility and training aircraft in addition to two models of commuter aircraft (228-100 and 228-200). Additionally, the company is involved in license production of components for a leading U.S. military aircraft manufacturer. Dornier is a privately owned company. The firm first produced commuter airplanes in 1981. 1/ Industry sources indicate that, to date, Dornier has not imported any of these commuter planes into the United States. The firm's gross sales in 1981 amounted to $604 million compared with $502 million in 1984. 2/

Embraer.--Embraer of Brazil was created on August 19, 1969, and came into operation as of January 2, 1970. The industry's development was aided by the United Nations Development Program and the Federal Aviation Administration. 3/ The company is a quasi-private/Government entity; 92 percent of the subscribed capital is held by 222,480 public shareholders, who benefit from tax concessions for investing in an advanced industry. The Government of Brazil has an 8-percent holding; however, the Government holds 51 percent of the voting shares. 4/ Embraer now has an authorized capital of CR$4.84 billion, of which CR$3.62 billion had been subscribed by December 1980. Since August 1974, Embraer has had a comprehensive cooperative agreement with Piper Aircraft Corp. (United States) involving the manufacture in Brazil of several models of single- and twin-engine airplanes. Additionally, the Brazilian firm produces military training and business aircraft. Embraer currently manufacturers the Bandeirante, which is an 18-seat, nonpressurized, commuter airplane; however, development of a 30-seat, twin-turboprop, commuter aircraft was undertaken in 1979. 5/ The firm had a workforce in May 1981 of 5,929 persons and a factory area of 1.4 million square feet. 6/ Profitability figures are not available for Embraer; however, according to industry data, total revenues increased 42 percent between 1978 and 1980, mostly on the strength of increased exports. 7/

Fokker B.V..--Fokker B.V. forms the entire aircraft industry in the Netherlands, with six plants in which a total of 8,900 people were employed in 1981. Until February 1980, Fokker and the West German company VFW were merged into Fokker-VFW B.V., Netherlands Aircraft Factories. The firm currently produces one model of commuter aircraft, a 50-seat turbprop airplane (F-27). This plane has been in series production for many years, both by Fokker B.V.

1/ Jane's All the World Aircraft, 1981-82, p. 77.

2/ "German Industry Faces Funding Cuts," Aviation Week and Space Technology, Sept. 6, 1982, p. 221.

3/ Jane's All the World Aircraft, 1981-82, p. 9.

4/ "Brazil Aerospace Today - The Industry that Can't Stop Growing," Interavia, July 1981, p. 707.

5/ Department of Commerce, "AEROSPACE: Brazil has Credible Aircraft Manufacturer," July 3, 1981.

6/ Jane's All the World Aircraft, 1981-82, p. 9.

7/ "Quasi-Public Ownership," Aviation Convention News, Nov. 1, 1981, p. 89.

and, for a period, by Fairchild Industries in the United States. However, Fokker B.V. also manufactures medium-transport aircraft (F-28) and components for military and civil airplanes. 1/ Profit figures for Fokker B.V. are not currently available.

Government Aircraft Factories.--The Government Aircraft Factories (GAF) are part of the Defense Production facilities owned by the Australian Government and operated by the Department of Industry and Commerce. Their functions include the design, development, manufacture, assembly, maintenance, and modifications of aircraft, target drones, and guided weapons. GAF currently manufactures two models of a twin-engine, turboprop, short takeoff and landing (STOL) airplane called the Nomad. The company is also a subcontractor for Boeing and Fokker B.V. In 1981, the firm had a workforce of approximately 2,500 persons. Profitability information for Government Aircraft Factories is not available. 2/ In October 1982, the firm announced that they would end production of their commuter aircraft by the end of 1984.

Israel Aircraft Industries Ltd.--Israel Aircraft Industries Ltd. was established in 1953 as Bedek Aircraft Co. The change of name to Israel Aircraft Industries was made on April 1, 1967. Israel Aircraft Industries is owned by the Government of Israel. The firm is composed of several divisions, plants, and subsidiary companies. These underwent a major reorganization in late 1977 and are now disposed in the following divisions: Bedek Aviation Division, Aircraft Manufacturing Division, Engineering Division, Electronics Division, Combined Technologies Division, and Airborne Systems Marketing Group. The Aircraft Manufacturing Division produces the Arava commuter airplane for 19 to 20 passengers, in addition to military and corporate aircraft. The firm is also engaged in the manufacture of a large variety of spares and assemblies for aircraft and jet engines to meet Israeli Air Force requirements. As a subcontractor to many U.S. and European aircraft manufacturers, the division produces major aircraft structures, flight-control surfaces, cargo-loading systems, and miscellaneous spare parts. In 1981, Israel Aircraft Industries employed over 22,000 persons in all its facilities, which occupied a total covered floor area of 4.8 million square feet. 3/ Information as to the profitability of the firm is not currently available.

Nutranio.--Nutranio of Indonesia developed from the air force overhaul base at Bandoeng. The firm was officially inaugurated in 1976 when Lipnur (Lembaga Industri Penerbangari Nutranio) combined its aircraft industry activities with those of the Pertamina oil company. Nutranio had a work force of approximately 5,000 persons in 1981. Many of the Indonesian engineers had previously been employed in foreign aircraft plants. The Indonesian firm manufactures CASA (Spain) commuter aircraft under license at its Bandoeng facility. Additionally, the firm is currently in a joint venture with the

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1/ Jane's All the World Aircraft, 1981-82, p. 260.
2/ Ibid., p. 5.
3/ Ibid., p. 112.

Spanish firm CASA as a 50-50 partnership in an $80 million project to design and build a pressurized 30- to 40-seat, short-haul, turboprop aircraft (CN 235). Information regarding the profitability of Nutranio is unavailable. 1/

Pilatus Britten-Norman.--Pilatus Britten-Norman Ltd. is a subsidiary of the Swiss firm Pilatus Aircraft Ltd. Prior to 1979, this firm operated under the name Britten-Norman Ltd., and was a British corporation. There are two commuter aircraft currently produced by this company--the Islander and the Trislander. Both the Islander and the Trislander are currently manufactured at Benbridge, Isle of Wright. The Islander, however, is also produced in Romania and under license in the Philippines. Employment and profit figures are not available. 2/ In September 1982, International Aviation Corp. of Homestead, Fla., purchased the manufacturing rights for the Trislander. The firm plans to produce the aircraft in the United States. 3/

Saab Scandia.--Saab Scandia was originally founded in 1937 as Svenska Aeroplan AB for the production of military aircraft. The company name was changed to Saab Aktiebulag in May 1965, and the company later mergered with Scandia-Vabis to form the present company. Saab Scandia employs nearly 40,000 employees, organized in 4 operating divisions. Of the total, about 6,000 employees work for the Aerospace Division. Current aerospace activities include production of military aircraft and development with Fairchild Aircraft (United States) of a 34-seat commuter aircraft. Saab-Scandia reports that it has arranged a Swedish Government loan on commercial terms to finance part of its development. 4/ A new production facility of 269,000 square feet has recently been completed for the production of this airplane. 5/

Short Brothers.--Short Brothers (Shorts) was first established in 1898, and in 1901, they began the manufacture of balloons. In March 1909, Shorts opened their aircraft factory at Shellbeach, Isle of Sheppey. In June 1936, Shorts in collaboraton with Harland and Wolff Ltd., formed a new company known as Short & Harland Ltd., to build aircraft in Belfast. The name Short Bros. was readopted on June 1, 1977. The British Government now owns, directly or indirectly, 100 percent of the issued shareholding. The company's current products include 30- and 36-seat commuter airplanes and a van turboprop light transport (used for cargo and miscellaneous operations). Internationally, Shorts is collaborating as a risk-sharing partner with Fokker B.V. of the Netherlands in production of a medium transport. Additionally, the firm supplies components to many American and British aerospace companies. 6/ Employment and profitability figures are not available for Short Bros.

1/ Anthony Vandyk, "Market Wise "CASA Links Future to Burgeoning Commuters," Commuter Air, June 1982, pp. 23 and 24.

2/ Jane's All the World Aircraft, 1981-82, p. 265.

3/ "U.S. Distributor Buys Trislander Rights," Aviation Week and Space Technology, Sept. 6, 1982, p. 76.

4/ Dr. W. Stephen Piper, United States Trade Representative, "The Commuter Aircraft Industry: International Trade Aspects," July 30, 1980.

5/ Jane's All the World Aircraft, 1981-82, p. 176-177.

6/ Jane's All the World Aircraft, 1981-82, p. 260.

Medium- and large-transport aircraft

Airbus Industrie.--Airbus Industrie was set up in December 1970 as a Groupement d'Interet Economique (CIE) 1/ to manage the development, manufacturing, marketing, and support of a twin-engined large transport known as the A300. This management now extends to the A310 and other types of aircraft. Airbus Industries is responsible for all work on these programs by the partner companies, made up of Aerospatiale of France (which has a 37.9-percent interest in the program), Deutsche Airbus (MBB) of Germany (37.9-percent share), British Aerospace of the United Kingdom (20-percent share), and Casa of Spain (4.2-percent share). Fokker B.V. of the Netherlands is an associate in the A300 and A310 program; Belairbus of Belgium is an associate in the program for the A310, and Soko of Yugoslavia is an associate in the A300 and A310 programs. Some of the Deutsche Airbus work on the A300/A310 is subcontracted to the Italian aerospace industry. 2/ Additionally, the Canadian Government recently disclosed its intention to seek a 10-percent share in Airbus Industrie's A320 project to develop a 150-seat transport. 3/ Airbus Industrie itself employs, at present, only 800 people. These firms manufactured components in 66 factories and employed 14,900 persons for the production of the A300/A310 in 1980. 4/ Airbus Industrie's ordinary expenses are financed through an annual budget, which it submits to the members for approval. Each program participant agrees to perform, or have performed, an agreed-upon share of research and development. Costs are financed on a national basis by the participants, partially backed by Government loans. These loans are repaid by an agreed share of the proceeds of aircraft sales, transferred by Airbus Industrie to the partners upon receipt. The major portion of funds from sources external to Airbus Industrie takes the form of bank loans made on commercial terms to member companies to enable them to finance work in progress. 5/

British Aerospace Public Ltd. Co.--British Aerospace Public Ltd. Co. (British Aerospace) of the United Kingdom was established by the Aircraft and Shipbuilding Industries Act of 1977, as a result of which, on April 29, 1977, the ownership of four separate companies was vested in the corporation. Initially, the four firms continued to trade under their existing names. However, as of 1978, a new structure for British Aerospace was implemented, whereby the corporation functions through two operating groups: Aircraft and Dynamics. Currently, the ownership of British Aerospace is structured as follows: the British Government, 48.43 percent; shareholders 48.43 percent, and employees, 3.14 percent. There were approximately 60,000 people employed

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1/ A GIF is a grouping of mutual economic interests created under French law in 1967. The purpose of a GIE is to increase the extent of the associates' current activities and so enable its members to increase the profitability of their own enterprises, not to make a profit itself.

2/ Jane's All the World Aircraft, 1981-81, p. 93.

3/ "Canada Seeks 10 Percent Share in A320," American Metal Market, July 26, 1982, p. 1.

4/ Airbus Industrie, Power Behind The Products, 1980.

5/ Airbus Industrie, Airbus Industrie Briefing, 1982.

in aircraft operations in 1981. The firm currently manufacturers two medium transports, the BAe-111 and the BAe-146. The BAe-111 was first produced in the early 1960's and to date, five versions have been produced. Design and manufacture are shared between three divisions located at Weybridge, Filton, and Horn. The BAe-146 is being produced in several factories, with the Hatfield Division responsible for final assembly and flight testing. Following the production decision on the BAe-146, risk-sharing agreements were signed with Avco Aerostructures (United States) and Saab-Scania (Sweden). Two series are available, and initial deliveries of aircraft are to begin in 1983. Orders and options totaled 13 and 12, respectively, by June 1981, with the majority of the aircraft to be delivered to U.S. purchasers. British Aerospace also manufactures two commuter aircraft, various military planes, and is a partner in Airbus Industries. 1/ The firm employed approximately 79,200 workers in 1981. British Aerospace earned an 18-percent return on operating assets in 1981. Sales amounted to 1.6 billion pounds sterling in 1981, representing a 14.3-percent increase from the 1980 sales figure. In 1981, exports represents 61.8 percent of the firm's sales. 2/

Fokker B.V.--Fokker B.V. forms the entire aircraft industry in the Netherlands with 6 plants in which 8,900 people were employed in 1981. Until February 1980, Fokker and the West German company VFW were merged into Fokker-V.F.W. B.V., Netherlands Aircraft Factories. The firm currently produces a medium transport designated the F-28. The F-28 was developed in collaboration with other European aircraft manufacturers, with prefinancing from the Netherlands Agency for Aerospace Programs and through a loan guaranteed by the Dutch Government. Production is undertaken by Fokker in association with MBB in West Germany and Short Brothers in Northern Ireland. The firm also produces one model of commuter aircraft and components for military and civil airplanes. 3/

In 1981, sales amounted to $448.5 million, representing an increase of 13.6 percent over sales in the previous year. Profits rose 10.8 percent from the 1980 figure, totaling $4.1 million in 1981. Officials of Fokker indicate that they plan to expand F-28 sales in the United States. 4/

1/ Jane's All the World Aircraft, p. 235-36.

2/ British Aerospace Public Ltd. Co., Annual Report and Accounts 1981.

3/ Jane's All the World Aircraft, p. 151.

4/ Sam L. Jones, "Fokker Eyes U.S. Market, Gives F-28 Jet Carrier Capability," American Metal Market, Sept. 13, 1982, p. 28.

Helicopters

Aerospatiale.--The French firm of Societe Nationale Industrielle Aerospatiale (Aerospatiale) was formed on January 1, 1970, by a decision of the French Government to merge the former Sud-Aviation, Nord-Aviation, and SEREB companies. It is the biggest aerospace company in the Common Market countries on the continent of Europe, with a registered capital of 447.4 million francs, facilities extending over a total area of 105.4 million square feet, and a staff, including subsidiary companies, of 38,173 persons at the beginning of 1980. 1/ Aerospatiale has been nationalized since 1936; the French Government owns at least 51 percent of the firm's assets and fills a majority of the seats on the Board of Directors. Corporate officials indicate that about half of the research and development performed by Aerospatiate comes from the French Government, and the other half represents investment of profits. 2/

Aerospatiale's helicopter activities are concentrated at the Marignane plant and involve the development and production of a wide range of turbine powered models. Agreements concluded with Westland in the United Kingdom covered joint development and production of three versions of helicopters. 3/ The firm expects to produce 75 helicopters monthly by the middle of 1983. The average monthly production rate in 1981 was 35 helicopters. By the beginning of 1981, aerospatiale had delivered a total of 4,124 helicopters. 4/ According to industry sources, approximately 85 percent of Aerospatiale's production is exported. The firm builds and tests the helicopters in France and then disassembles them and exports them to the United States, where they are reassembled in the Grand Prarie, Tex. plant. This facility also handles sales and service operations for the United States. Aerospatiale's share of the worldwide market for helicopters has increased from 10 to 20 percent over the last decade. 5/

Agusta.--Construzioni Aeronautiche Giovanni Agusta SpA (Agusta) of Italy was established in 1907 by Giovanni Agusta and built many experimental and production aircraft before the second world war. In 1952, Agusta acquired a license to manufacture the Bell Model 47 helicopter and the first Agusta-built model made its initial flight on May 22, 1954. Agusta is now producing several helicopter models under license with Bell, Sikorsky, and Boeing Vertol. Additionally, the firm is collaborating with Westland Helicopters of the United Kingdom in developing a new helicopter. 6/ Agusta currently markets 1 civil helicopter model in the United States, the 109A. The firm has had limited success in the United States with this corporate/utility helicopter in 1981.

1/ Jane's All the World Aircraft 1981-82, p. 44.
2/ "Aerospatiale Fine Tunes Rotorcraft Production," Rotor & Wing International, June 7, 1982, p. 45.
3/ Jane's All the World Aircraft 1981-82, p. 44.
4/ Helicopter News, May 10, 1982, p. 80.
5/ "Aerospatiale Fine Tunes Rotorcraft Production," Rotor & Wing International, June 7, 1982, p. 45.
6/ Jane's All the World Aircraft, 1981-82, p. 124.

Agusta's U.S. operations are currently handled by an office in Philadelphia, Pa. The firm was previously located in Houston in an attempt to be near the offshore petroleum market, but that market never developed into a substantial revenue producer for the subsidiary of the Italian manufacturer. Industry sources indicate that future marketing efforts by Agusta will be more sharply focused on the corporate and emergency medical service areas. 1/

MBB.--In May 1969, the former Messerschmitt-Bolkow-GmbH and Hamburger Flugzeubau GmbH merged to form a new group known as Messerschmitt Bolkow-Blohm GmbH (MBB) of West Germany. In 1980, the West German Government expressed its wish that MBB and another firm, VFW, should merge to strengthen the capabilities and competitive position of the two companies and to help improve the structure of the West German aerospace industry. On January 1, 1981, following approval by the shareholders of both companies, MBB acquired all shares of VFW. Shareholders in this company are Fides GmbH (25.7 precent), the State of Hamburg (18.23 percent), Bayerische Landesantalt for Aufbaufinanzierung (16.5 percent), ABM GmbH (13.56 percent), VFW (10.0 percent), the State of Bavaria (7.02 percent), the Messerschmitt Foundation (6.75 percent, Dr-Ing h.c. Ludwig Bolkow (1.57 percent), and the Blohm family (0.67 percent). The company employed approximately 3,900 people in early 1981. 2/

Integration of the two companies is now taking place progressively, and in April 1981, their activities were organized into several product-oriented divisions. Helicopters are produced by the Helicopter and Transport Systems Division, with plants at Ottobrunn, Donauworth, Laupheim, Speyer, Kassel, and Lemueder. 3/ The firm currently produces three models of civil helicopters, and is working with prototypes of two additional models. 4/ MBB also produces military aircraft, missles, submarine drones, and satellites and has a wholly owned subsidiary (Deutsche Airbus), which is a partner in the production of large transports. 5/

Marketing and customer support for MBB helicopters in the United States are handled by MBB Helicopter Corp., West Chester, Pa., a subsidiary of MBB. Profits amounted to 50 million deutsche marks in 1980, the latest figure available. 6/

Westland.--Westland Aircraft Ltd. of the United Kingdom was formed in July 1935 to take over the aircraft branch of Petters Ltd., previously known as the Westland Aircraft Works. The firm entered the helicopter industry in 1947, acquiring the license to build Sikorsky helicopters, of which it produced 133 under the name Westland Dragonfly. Westland is part of a large British conglomerate called the Westland Group. The group's operations include hovercraft and control equipment and systems, as well as helicopters.

1/ Helicopter News, Aug. 16, 1982.
2/ Jane's All the World Aircraft, 1981-82, p. 82.
3/ Ibid.
4/ Aerospace Industries Association, Directory of VTOL Aircraft 1982, 1982.
5/ Jane's All the World Aircraft, 1981-82, p. 82.
6/ MBB Annual Report 1980, 1981.

In 1959 the Westland Group acquired Sanders-Roe Ltd., and in 1960 acquired the Helicopter Division of Bristol Aircraft. Due to these acquisitions, Westland is the only major helicopter design and manufacturing organization in the United Kingdom. Since October 1, 1966, the company's helicopter business has been conducted through a wholly owned company named Westland Helicopters Ltd. The firm's U.S. operations are handled in their Washington, D.C., office. Westland currently produces one model of civil helicopter, the Westland 30. 1/ The helicopter commuter airline industry has been the major market for the 17 to 22-passenger model 30. 2/ Additionally, Westland Helicopters and Agusta of Italy have jointly formed a company called EH Industries to develop and produce an antisubmarine helicopter. 3/ Westland indicates that it will invest 2.7 million pounds sterling of its own funds in EH Industries. Additionally, the Governments of the United Kingdom and Italy will invest in the firm. 4/

Westland employed 7,564 workers as of September 30, 1981. Sales of helicopters, including military models, in the year ending September 30, 1981, amounted to 179.3 million pounds sterling, representing a decrease of 2.5 percent from the 1980 figure. Profit before taxes totaled 17.3 million pounds sterling in 1981. This represents a 9.6-percent return on sales, compared with 9.7 percent in 1980. 5/

1/ Jane's All the World Aircraft, 1981-82, p. 124.
2/ Don Toler, "The British Are Coming," Rotor & Wing International, November 1981, p. 37.
3/ Jane's All the World Aircraft, 1981-82, p. 124.
4/ "Westland Weathers Military Helicopter Market Decline," Flight International, Feb. 6, 1982, p. 278.
5/ Ibid.

APPENDIX D

PRESENT-VALUE ANALYSIS

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The effects of differences, in terms of financing, on purchasers' costs of equipment can be measured by calculating the present value of the future payments required under the terms of each contract. The present-value method is the most common way of comparing the costs of two different contracts that call for a series of payments to be made. The present value is the amount of money that if paid today would be equivalent to a schedule of future payments, assuming that the firm faces a given market rate of interest.

The present value is a weighted sum of a series of payments. Payments that are further into the future receive lower weights, because if a purchaser can postpone payments for its equipment, it may be able to reduce its other borrowings or to retain its earnings in interest-bearing accounts for a longer period of time. 1/ Thus, purchasers will prefer financing packages that allow them to postpone payments for as long as possible. As a result, the full cost of a purchase will depend not only on the price and the offered interest rate, but also on other factors affecting the timing and size of the payments. The benefits of postponing payments depend on the market interest rates, because were payments not postponed, the purchaser would have to reduce its lending or increase its borrowing at these rates. Therefore, present value will also depend on the market interest rate.

The present value of a future payment required by a contract can be thought of as the amount of money that would have to be invested in interest-bearing securities today if the securities were to be cashed in the future to make the contractual future payment. The amount of investment needed today is called the discounted value of the future payment, and it decreases the higher the market interest rate and the further into the future the payment must be made. The present value of a series of future payments is the sum of their discounted values. Because present value depends on all factors affecting the size and timing of payments, computing present values requires comprehensive information on the financing terms involved in a contract. A major advantage of using present values is that two contracts that may vary in many different respects, such as interest rates, repayment periods, and down payments, may be compared on the basis of a single measure.

1/ The formula for determining the present value (PV) of a series of future payments (P_t) is:

$$PV = \sum_{t=o}^{n} \frac{P_t}{(1+r)^t}$$

Where t is the time period and r is the market rate of interest. The term $1/(1+r)^t$ is called the discount factor. Because the discount factor gets smaller with an increase in time, payments further into the future are discounted more than earlier payments. That is, if an investment were to be made today, the longer it were allowed to collect interest or the higher the interest rate, the smaller the amount that would have to be invested to make a given future payment.

Interest rate differentials and other costs

The relationship between interest rate advantages and other costs can be found using present value analysis. This method was used to construct figures 1 and 2 in the medium and large transport section. These figures show the advantage in price or fuel efficiency that would offset a given interest rate differential.

Because the present value of an aircraft financed at market interest rates is equal to its price, the price advantage needed to offset a given interest rate differential is equal to the reduction in present value that differential causes. The decrease in present value due to an X percentage point interest rate differential was measured by finding the present value of an aircraft financed at a 12 percent interest rate for a period of 10 years when the market interest is 12 + X percent. 1/ The percentage difference between that present value and the aircraft's price is equal to the decline in present value due to the below market financing.

The fuel efficiency advantage that offsets a given interest rate differential can be found by a simple formula. To derive this formula let

$$TC = PVC + FE + MC$$

Where

TC is the total cost of owning and operating an aircraft

PVC is the interest cost and the price, the costs that are included in present value

FC is the cost of fuel

MC is all other costs

Taking derivatives

$$dTC = dPVC + d\ FC + dMC$$

If all other costs are held constant, dMC = 0.

Now divide through by TC and express all derivatives in logarithmic form

$$d \log TC = \frac{PVC}{TC} d \log PVC + \frac{FC}{TC} d \log FC$$

The fuel cost advantage that offsets a change in present value costs, so total costs do not change can be found by setting d log TC equal to 0 so

$$0 = \frac{PVC}{TC} d \log PVC + \frac{FC}{TC} d \log FC$$

Data in page 61 indicate that

$$\frac{PVC}{TC} = .243 \quad \text{and} \quad \frac{FC}{TC} = .452 \quad \text{so } d \log FC = \frac{.243}{.452} d \log PVC = -.54\ d \log PVC$$

1/ Present value is calculated for a loan calling for 20 equal semi-annual payments of principle plus payment of interest with the downpayment made at delivery and the first payment made six months later.

Now d log FC = -d log mileage where mileage is the number of miles per gallon the aircraft gets. Therefore, the increase in an aircraft's mileage needed to offset a given interest rate differential is equal to 54 percent of the reduction in present value caused by that differential.

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APPENDIX E

CASE STUDY: LOST SALE DUE TO EXPORT CREDIT FINANCING CLAIMED BY * * *

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APPENDIX F

ESTIMATING THE RELATIONSHIP BETWEEN CHANGES IN IMPORTS AND CHANGES IN DOMESTIC PRODUCTION

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Studies of how imports affect domestic industries often assume, for simplicity, that if imports increase, domestic production decreases by an equal amount. However, such a decrease will only equal the increase in imports under special circumstances. In general, the domestic industry will respond to an increase in imports by reducing price. With lower prices, total sales will expand, and domestic sales will most likely fall by less than the increase in imports. The extent to which an increase in imports will reduce domestic production will depend on the extent to which domestic producers reduce their sales and buyers increase their purchases when price falls.

The reactions of producers and purchasers to changes in prices are measured by the elasticities of supply and demand; such elasticities determine the ratio of the decrease in production to the increase in imports. Estimates of supply and demand elasticites for aircraft made by the Commission indicate that an increase in imports reduces domestic production of aircraft by 43 percent of the increase.

The ratio of import changes to production changes

The ratio of the change in domestic production to the change in imports is given by the following formula.

$$\frac{dQ}{dM} = \frac{E_s}{E_s - E_d}$$

Where dQ is the change in domestic production, dM is the change in imports, E_s is the elasticity of supply, and E_d is the elasticity of demand.

A detailed discussion of the derivation of this formula is given in a recent Commission report. 1/ Therefore, this appendix will only briefly describe this derivation.

The market for aircraft can be described using two equations

$$S(P) = Q \qquad 1$$

$$D(P) = M + Q \qquad 2$$

1/ From an unpublished Commission report on investigation No. 332-142 entitled The Impact of Foreign Trade-Related Performance Requirements On U.S. Industry and Foreign Investment Abroad, September 1982, app. F.

Equation 1, the supply function, states that the domestic industry's production, Q, is determined by price, P. Equation number 2, the demand function, states that total purchases, the sum of imports, M, and domestic sales, Q, are also determined by price. 1/ Factors other than price will influence demand and supply, but because these factors will not affect the derivation, they are not included in the equations.

Totally differentiating equations 1 and 2 we find

$$dQ - S_p\, dP = 0 \qquad 3$$

$$dQ - D_p\, dP - dM = 0 \qquad 4$$

where S_p and D_p are the derivatives of the supply and demand curves with respect to price, and dP is the change in price.

Equations 3 and 4 can then be solved for dQ

$$dQ = \frac{S_p}{S_p - D_p}\, dM \qquad 5$$

By the definition of elasticity

$$E_s = S_p\,(P/Q) \qquad 6$$

$$E_d = D_p\,(P/Q) \qquad 7$$

so we can multiply the numerator and denominator of the right hand side of equation 5 by P/Q, and then divide both sides by dM.

$$\frac{dQ}{dM} = \frac{E_s}{E_s - E_d} \qquad 8$$

1/ This form of the demand function assumes imports are a perfect substitute for domestic production. Because aircraft are a very heterogeneous product, imports are unlikely to be a perfect substitute for the domestic product. To the extent that imports are not perfect substitutes, their effect on domestic production is reduced.

If the assumption of perfect substitutability is dropped, then estimating the relationship between import changes and domestic production would require estimating the degree of substitutability between imports and the domestic products. Because of data limitations, attempts to estimate the degree of substitutability failed. Therefore, the assumption of perfect substitutability was used.

This ratio will equal 1 only if the demand elasticity is zero or if the supply elasticity is infinite. The demand elasticity will equal zero only if purchasers do not buy more of a product when its price falls. The supply elasticity will be infinite only if producers stop selling a product when its price falls.

Estimating the elasticities of demand and supply

Elasticities of demand and supply for the aircraft industry were estimated with an econometric model. The estimated elasticity of demand is -3.35; the estimated elasticity of supply is 2.52. 1/ Therefore, the estimated ratio of the change in domestic production to the change in imports is .43.

The econometric model expresses demand as a function of price, as represented by the aircraft sector's output deflator. To adjust for inflation, this price is divided by the wholesale price index. The output price, therefore, is expressed in constant dollars. Demand is also a function of passenger-miles of both U.S. and foreign airlines. These two variables are entered separately rather than added together, because foreign airlines may be less likely to buy U.S.-made aircraft than U.S. airlines. Because airlines often order planes far in advance, and because they consider more than 1 year's traffic level when determining their equipment needs, lagged passenger-mile variables were also included in the demand function. Different lag structures were tried; a 3-year lag was selected, because equations using shorter lags explained much less of the variance in demand and had coefficient estimates with much higher variances. A lagged-price term was used in some demand estimations, but it was insignificant, so it was dropped. Because industry sources indicated that airline deregulation increased the demand for commuter airplanes, a dummy variable that equaled 1 in the years after deregulation and zero otherwise was also included. 2/

Supply is also expressed as a function of the price of aircraft and certain other variables. A lagged aircraft price term is included, because manufacturers may take time to adjust to price changes. The supply function

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1/ These estimates are of the short-run elasticities of supply and demand. If purchasers and producers have more time to adjust to price changes, they are likely to make larger changes in their purchases and output. The long-run elasticities of supply and demand, therefore, are probably larger than the short-run elasticities. Because the ratio of the change in domestic production to the change in imports depends on the ratio of these elasticities, it is not certain how the use of long-run rather than short-run elasticities would affect the results.

2/ One variable that could influence the demand for U.S. aircraft is the output of foreign producers. Because data on this variable are unavailable, however, it was excluded from the model. Excluding this variable would only seriously bias the estimated coefficients if the excluded variable were highly correlated with the included variables.

includes input prices, because if it becomes more expensive to produce aircraft, all else equal, manufacturers will probably produce less. These prices are also deflated by the wholesale price index. A time-trend variable is also included, because as time passes, technological progress makes it less costly to produce planes.

The demand and supply functions were estimated using annual data from 1958 to 1981. In both functions, output was defined as civilian aircraft produced for domestic use or for export. Output was measured in constant dollars. Price data were from official statistics of the U.S. Department of Labor, other data were from Aerospace Industries Association, Aerospace Facts and Figures. 1/

The demand and supply functions were estimated using two-stage least squares, because each function used an endogenous variable, price, as an explanatory variable. Several problems were encountered in these estimations. Because the number of explanatory variables in each equation was large relative to the number of observations, and because some of the explanatory variables were highly correlated with each other, the estimates of the coefficients had high variances. 2/ These problems, however, will not bias the estimates.

A log-linear form of the equations was estimated; results are presented in tables F1 and F2. The regression equations are statistically significant and explain a large amount of the variance in demand and supply. Because of the problems encountered in the estimations, however, the individual coefficient estimates are often disappointing. In general, these coefficients are only significant at very low levels of confidence. Furthermore, the price of nonferrous metals should be negatively related to supply; these results suggest a positive relationship.

1/ (Aerospace Industries Association, Washington, D.C., various years).

2/ Another reason these estimates had high variances may be autocorrelation. The Durbin-Watson test for autocorrelation was inconclusive. If autocorrelation is present, the variances of the estimates may increase the significance tests used to evaluate the estimates will be biased. Autocorrelation, however, will not bias the estimates themselves.

Table F1.--Aircraft: Estimated demand function for aircraft

Variable 1/	Coefficient	T ratio
Intercept	-1.07	-1.69
Price	-3.35	2/ -2.13
Deregulation dummy	.18	1.22
Passenger-miles U.S. airlines (PM)	1.21	1.57
PM lagged once	1.35	1.16
PM lagged twice	.77	.63
PM lagged thrice	-.83	-1.00
Passenger-miles foreign airlines (PMF)	-2.10	-1.26
PMF lagged once	-1.06	-.51
PMF lagged twice	.11	.06
PMF lagged thrice	1.49	.90
Regression as a whole: F ratio	-	3/ 22.69
R2	-	.95

1/ All variables except the deregulation dummy are in log form.
2/ Significant at the 5-percent level.
3/ Significant at the 1-percent level.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table F2.--Aircraft: Estimated supply function for aircraft

Variable 1/	Coefficient	T ratio
Intercept	3.00	7.62
Price	2.52	1.57
Price lagged once	-.67	-.42
Iron and steel price	-3.00	-2.52
Bolts and rivets price	-.55	-1.12
Nonferrous metals price	2.37	3.12
Time trend	.07	4.91
Regression as a whole: F-ratio	-	3/ 21.80
R2	-	.89

1/ All variables except the time trend are in log form.
2/ Significant at the 5-percent level.
3/ Significant at the 1-percent level.

Source: Estimated by the staff of the U.S. International Trade Commission.

The estimated elasticities of demand and supply, however, only depend on the estimates of the coefficients of the pricing variables. These estimates both have the expected sign. Demand is negatively related to price; supply is positively related to price. The estimated price elasticity of supply is only significantly greater than zero at a 14-percent level. 1/ This significance level is higher than the 5-percent level usually considered acceptable in econometric models. However, because of the small number of observations and the highly correlated explanatory variables, these estimators had a high variance; therefore, they are particularly likely to appear to be insignificant. The price coefficient in the demand function is significantly less than zero at the 5-percent level. Because the log-linear form of the demand and supply equations was used, the estimated coefficierts on the pricing variables are equal to the elasticities. The estimated elasticity of demand is -3.35; the estimated elasticity of supply is 2.52.

1/ If supply is unrelated to price, the elasticity of supply is zero, and changes in imports do not affect domestic production.

APPENDIX G

AN ANALYSIS OF THE AIRBUS INDUSTRIE SALE TO EASTERN AIRLINES

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Appendix H

INDEX OF CONTRACT AWARDS FOR HEAVY ELECTRICAL EQUIPMENT

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Table H1.--Index of contract awards for power circuit breakers, by values of awards, 1977-81 and January-September 1982

Period and successful bid (domestic/foreign)	Quantity bid on	Unsuccessful bids										
		Domestic				Foreign						
		1	2	3	4	1	2	3	4	5	6	7
		Successful bid = 100										
1977:												
Domestic	1	102	113	-	-	128	138	-	-	-	-	-
Do	1	106	113	-	-	141	-	-	-	-	-	-
Do	3	107	111	-	-	139	124	-	-	-	-	-
Foreign	4	135	142	145	176	92	132	-	-	-	-	-
Do	2	135	142	145	176	92	132	-	-	-	-	-
Do	5	135	142	145	176	92	132	-	-	-	-	-
Domestic	6	108	120	105	-	-	-	-	-	-	-	-
Foreign	8	124	124	-	-	-	-	-	-	-	-	-
Domestic	11	114	108	-	-	102	147	-	-	-	-	-
Do	12	102	105	114	-	104	98	-	-	-	-	-
Foreign	1	-	-	-	-	-	-	-	-	-	-	-
Do	3	183	167	156	-	106	118	132	-	-	-	-
Do	2	145	131	-	-	105	110	111	-	-	-	-
Do	1	112	112	-	-	137	-	-	-	-	-	-
Domestic	5	100	-	-	-	89	123	-	-	-	-	-
Foreign	1	107	118	136	-	105	-	-	-	-	-	-
1978:												
Domestic	1	99	100	109	-	-	-	-	-	-	-	-
Do	1	116	-	-	-	137	-	-	-	-	-	-
Foreign	9	123	125	-	-	-	-	-	-	-	-	-
Do	1	135	145	147	-	-	-	-	-	-	-	-
Do	6	160	158	-	-	-	-	-	-	-	-	-
Do	1	136	-	-	-	124	-	-	-	-	-	-
Do	1	137	-	-	-	102	-	-	-	-	-	-
Do	3	112	108	-	-	127	-	-	-	-	-	-
Do	6	112	108	-	-	127	-	-	-	-	-	-
Domestic	4	100	-	-	-	95	112	-	-	-	-	-
Foreign	2	101	110	126	-	-	-	-	-	-	-	-
Do	7	128	141	122	156	-	-	-	-	-	-	-
Do	1	142	135	108	-	101	135	-	-	-	-	-
Domestic	3	147	135	-	-	108	-	-	-	-	-	-
Foreign	8	131	120	129	-	101	-	-	-	-	-	-
Do	4	113	113	119	104	-	-	-	-	-	-	-
Domestic	4	181	-	-	-	116	119	-	-	-	-	-
1979:												
Domestic	1	112	125	-	-	-	-	-	-	-	-	-
Foreign	2	152	-	-	-	114	-	-	-	-	-	-
Do	3	150	122	-	-	120	117	-	-	-	-	-
Do	4	101	105	-	-	101	104	-	-	-	-	-
Do	4	108	113	-	-	132	156	-	-	-	-	-
Do	5	224	121	-	-	105	164	113	-	-	-	-
Do	3	84	103	-	-	145	111	100	-	-	-	-
Do	2	112	356	-	-	88	166	159	-	-	-	-
Do	8	112	129	-	-	93	-	-	-	-	-	-
1980:												
Domestic	4	115	112	138	148	127	126	117	-	-	-	-
Do	2	115	112	138	148	127	126	117	-	-	-	-
Foreign	1	109	-	-	-	104	-	-	-	-	-	-
Do	1	119	-	-	-	110	105	-	-	-	-	-
Do	1	106	-	-	-	104	104	-	-	-	-	-
Do	9	108	126	106	-	107	118	103	107	-	-	-
Domestic	3	103	120	-	-	99	106	101	109	-	-	-
Do	1	197	-	-	-	92	138	162	115	101	134	142
Foreign	3	112	103	-	-	-	-	-	-	-	-	-
Do	3	102	-	-	-	-	-	-	-	-	-	-
Do	1	119	-	-	-	104	-	-	-	-	-	-
Do	1	144	142	-	-	101	108	-	-	-	-	-
1981:												
Foreign	11	102	-	-	-	107	-	-	-	-	-	-
Do	1	112	-	-	-	108	-	-	-	-	-	-
Do	1	117	-	-	-	110	105	-	-	-	-	-
Do	1	107	-	-	-	104	101	-	-	-	-	-
Do	6	96	106	-	-	116	104	-	-	-	-	-
Do	3	199	97	-	-	117	127	181	126	145	150	-
Do	8	110	135	-	-	131	-	-	-	-	-	-
Do	4	101	106	-	-	101	-	-	-	-	-	-
January-September 1982:												
Foreign	1	114	-	-	-	111	-	-	-	-	-	-
Do	1	118	-	-	-	110	104	-	-	-	-	-
Do	1	109	-	-	-	104	100	-	-	-	-	-

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table H2.--Index of contract awards for power transformers, by values of awards, 1977-81 and January-September 1982

Period and successful bid (domestic/foreign)	Quantity bid on	Unsuccessful bids												
		Domestic								Foreign				
		1	2	3	4	5	6	7	8	1	2	3	4	5
		Successful bid = 100												
1977:														
Foreign	2	83	90	87	91	110	-	-	-	100	-	-	-	-
Domestic	1	102	108	113	137	130	138	176	-	119	135	-	-	-
Foreign	1	84	86	91	96	115	109	116	148	114	-	-	-	-
Domestic	1	84	86	91	96	115	109	116	148	114	-	-	-	-
Foreign	1	98	117	106	112	135	128	136	173	133	-	-	-	-
Domestic	4	124	129	154	-	-	-	-	-	160	179	-	-	-
Do	3	124	129	154	-	-	-	-	-	160	179	-	-	-
Do	9	137	160	-	-	-	-	-	-	-	-	-	-	-
Foreign	2	115	115	122	-	-	-	-	-	-	-	-	-	-
Do	1	100	90	91	-	-	-	-	-	-	-	-	-	-
Do	1	92	98	106	-	-	-	-	-	-	-	-	-	-
Domestic	1	118	117	-	-	-	-	-	-	114	141	183	-	-
Do	1	105	128	-	-	-	-	-	-	134	167	185	193	-
Foreign	6	104	139	157	-	-	-	-	-	117	101	142	141	154
Domestic	1	135	105	-	-	-	-	-	-	165	-	-	-	-
Do	4	98	108	109	168	-	-	-	-	147	169	-	-	-
Do	1	82	107	107	121	135	-	-	-	121	125	155	-	-
Do	2	105	100	-	-	-	-	-	-	-	-	-	-	-
Do	1	104	-	-	-	-	-	-	-	107	-	-	-	-
Foreign	1	141	-	-	-	-	-	-	-	-	-	-	-	-
Domestic	1	109	110	-	-	-	-	-	-	114	-	-	-	-
Do	2	86	-	-	-	-	-	-	-	89	-	-	-	-
Do	3	124	124	125	154	-	-	-	-	163	210	119	128	143
Do	1	108	114	128	-	-	-	-	-	106	122	129	142	-
1978:														
Domestic	2	117	129	166	-	-	-	-	-	126	170	-	-	-
Foreign	1	92	105	141	119	-	-	-	-	-	-	-	-	-
Domestic	1	116	121	-	-	-	-	-	-	112	156	-	-	-
Do	1	107	116	127	-	-	-	-	-	150	-	-	-	-
Do	1	109	113	156	-	-	-	-	-	156	-	-	-	-
Do	1	107	105	162	-	-	-	-	-	-	-	-	-	-
Do	1	107	108	173	-	-	-	-	-	-	-	-	-	-
Do	1	116	136	-	-	-	-	-	-	-	-	-	-	-
Do	2	101	110	97	114	92	122	-	-	106	106	-	-	-
Do	2	99	108	95	113	91	121	-	-	104	104	-	-	-
Do	2	106	110	110	124	114	113	-	-	115	91	-	-	-
Do	1	106	110	110	124	114	113	-	-	115	91	-	-	-
Do	1	131	-	-	-	-	-	-	-	143	123	-	-	-
Do	1	135	-	-	-	-	-	-	-	148	124	-	-	-
Do	1	130	-	-	-	-	-	-	-	133	120	-	-	-
Do	1	-	-	-	-	-	-	-	-	105	121	-	-	-
Do	1	-	-	-	-	-	-	-	-	105	116	-	-	-
Do	1	-	-	-	-	-	-	-	-	113	126	-	-	-
Do	7	-	-	-	-	-	-	-	-	99	155	154	-	-
Do	7	99	-	-	-	-	-	-	-	116	158	-	-	-
Do	8	107	-	-	-	-	-	-	-	133	150	-	-	-
Do	1	111	-	-	-	-	-	-	-	132	104	-	-	-
Do	4	118	-	-	-	-	-	-	-	104	122	-	-	-
Foreign	11	-	-	-	-	-	-	-	-	144	144	-	-	-
Do	1	69	-	-	-	-	-	-	-	-	-	-	-	-
Do	4	112	-	-	-	-	-	-	-	-	-	-	-	-
Do	4	109	-	-	-	-	-	-	-	104	218	-	-	-
Do	2	81	-	-	-	-	-	-	-	99	-	-	-	-
Domestic	4	104	-	-	-	-	-	-	-	126	-	-	-	-
Do	2	92	-	-	-	-	-	-	-	-	-	-	-	-
Foreign	1	116	-	-	-	-	-	-	-	101	-	-	-	-
Domestic	1	100	91	113	-	-	-	-	-	115	-	-	-	-
Foreign	2	120	135	-	-	-	-	-	-	132	-	-	-	-
Domestic	1	107	162	145	-	-	-	-	-	152	128	-	-	-
Foreign	1	163	158	-	-	-	-	-	-	212	122	-	-	-
Do	2	176	172	-	-	-	-	-	-	281	-	-	-	-
Do	3	111	94	-	-	-	-	-	-	122	122	155	108	-
Domestic	1	84	81	79	-	-	-	-	-	-	-	-	-	-
Do	3	-	-	-	-	-	-	-	-	104	-	-	-	-
Do	1	152	-	-	-	-	-	-	-	94	102	-	-	-
Foreign	1	108	98	106	98	-	-	-	-	-	-	-	-	-
Domestic	1	103	95	107	-	-	-	-	-	124	-	-	-	-
Do	1	103	94	113	-	-	-	-	-	110	125	143	-	-
Do	1	127	116	90	-	-	-	-	-	148	96	-	-	-
Foreign	10	122	158	212	172	172	-	-	-	161	-	-	-	-
Domestic	4	106	-	-	-	-	-	-	-	113	118	121	-	-
Do	4	-	-	-	-	-	-	-	-	112	173	143	127	-
Do	4	110	110	-	-	-	-	-	-	132	200	123	-	-
Foreign	4	86	86	95	-	-	-	-	-	134	128	126	-	-
Domestic	2	143	-	-	-	-	-	-	-	113	-	-	-	-
Do	2	148	-	-	-	-	-	-	-	103	-	-	-	-
Foreign	2	103	108	110	-	-	-	-	-	-	-	-	-	-
Do	2	-	-	-	-	-	-	-	-	108	112	120	-	-
Domestic	4	97	-	-	-	-	-	-	-	95	135	-	-	-

Table H2.--Index of contract awards for power transformers, by values of awards, 1977-81 and January-September 1982--Continued

Period and successful bid (domestic/foreign)	Quantity bid on	Unsuccessful bids												
		Domestic								Foreign				
		1	2	3	4	5	6	7	8	1	2	3	4	5
		Successful bid = 100												
1979:														
Domestic	2	96	106	127	-	-	-	-	-	125	96	-	-	-
Do	2	96	106	127	-	-	-	-	-	125	96	-	-	-
Do	2	96	106	127	-	-	-	-	-	125	96	-	-	-
Do	3	96	106	127	-	-	-	-	-	125	96	-	-	-
Do	2	88	94	107	-	-	-	-	-	106	97	-	-	-
Foreign	1	84	89	94	-	-	-	-	-	112	115	-	-	-
Domestic	1	103	103	-	-	-	-	-	-	103	-	-	-	-
Do	2	103	113	-	-	-	-	-	-	111	-	-	-	-
Foreign	1	99	109	-	-	-	-	-	-	124	-	-	-	-
Domestic	2	103	-	-	-	-	-	-	-	96	108	-	-	-
Do	1	98	94	112	-	-	-	-	-	113	-	-	-	-
Foreign	2	104	121	124	-	-	-	-	-	-	-	-	-	-
Do	1	104	121	124	-	-	-	-	-	-	-	-	-	-
Domestic	1	116	113	-	-	-	-	-	-	133	-	-	-	-
Foreign	1	154	125	-	-	-	-	-	-	110	139	-	-	-
Domestic	3	101	-	-	-	-	-	-	-	117	137	128	107	124
Foreign	1	105	-	-	-	-	-	-	-	171	187	111	131	166
Domestic	4	91	150	90	-	-	-	-	-	-	-	-	-	-
Do	6	81	103	-	-	-	-	-	-	150	-	-	-	-
Foreign	1	94	97	104	-	-	-	-	-	92	118	139	143	-
Do	1	134	-	-	-	-	-	-	-	101	-	-	-	-
Do	16	102	107	-	-	-	-	-	-	103	-	-	-	-
Domestic	2	127	108	-	-	-	-	-	-	127	-	-	-	-
Foreign	1	93	85	100	-	-	-	-	-	-	-	-	-	-
Do	1	84	83	98	108	-	-	-	-	87	97	-	-	-
Do	1	77	92	77	103	-	-	-	-	82	89	-	-	-
Do	1	103	129	106	-	-	-	-	-	-	-	-	-	-
Do	2	152	135	144	-	-	-	-	-	-	-	-	-	-
Domestic	4	111	-	-	-	-	-	-	-	150	117	177	138	147
Do	2	111	-	-	-	-	-	-	-	158	-	-	-	-
Do	1	120	126	132	-	-	-	-	-	159	109	101	-	-
Do	2	96	-	-	-	-	-	-	-	120	96	-	-	-
1980:														
Foreign	3	93	90	117	117	103	105	-	-	-	-	-	-	-
Domestic	1	74	108	139	125	-	-	-	-	-	-	-	-	-
Do	2	110	102	78	119	-	-	-	-	107	-	-	-	-
Foreign	2	93	90	117	117	103	105	-	-	121	-	-	-	-
Domestic	2	126	127	129	-	-	-	-	-	106	121	-	-	-
Do	1	101	110	-	-	-	-	-	-	98	-	-	-	-
Do	2	95	107	-	-	-	-	-	-	113	-	-	-	-
Do	1	115	112	-	-	-	-	-	-	105	-	-	-	-
Do	1	113	139	-	-	-	-	-	-	131	-	-	-	-
Do	3	77	77	-	-	-	-	-	-	81	-	-	-	-
Do	1	102	110	118	-	-	-	-	-	111	-	-	-	-
Do	1	79	101	114	-	-	-	-	-	86	-	-	-	-
Do	1	101	118	129	-	-	-	-	-	126	-	-	-	-
Do	1	108	120	-	-	-	-	-	-	119	-	-	-	-
Do	1	101	118	129	-	-	-	-	-	126	-	-	-	-
Do	1	95	109	102	-	-	-	-	-	101	-	-	-	-
Foreign	2	112	123	123	-	-	-	-	-	-	-	-	-	-
Domestic	1	86	98	-	-	-	-	-	-	93	117	140	-	-
Foreign	1	125	105	-	-	-	-	-	-	129	120	92	116	-
Domestic	9	103	118	118	88	-	-	-	-	106	154	-	-	-
Do	6	127	145	-	-	-	-	-	-	186	138	-	-	-
Dc	1	114	112	131	114	-	-	-	-	119	131	-	-	-
Foreign	1	-	-	-	-	-	-	-	-	119	132	101	142	126
Do	4	120	-	-	-	-	-	-	-	130	-	-	-	-
Domestic	1	99	101	-	-	-	-	-	-	124	129	-	-	-
Do	3	132	-	-	-	-	-	-	-	186	105	-	-	-
Foreign	3	119	126	122	-	-	-	-	-	103	120	-	-	-
Domestic	1	158	114	-	-	-	-	-	-	119	-	-	-	-
Do	1	135	104	-	-	-	-	-	-	118	104	-	-	-
Foreign	4	146	112	-	-	-	-	-	-	120	146	125	-	-
Domestic	1	128	114	-	-	-	-	-	-	130	94	-	-	-
Do	1	137	153	-	-	-	-	-	-	124	130	-	-	-
Do	4	112	-	-	-	-	-	-	-	126	-	-	-	-
Do	4	154	119	123	-	-	-	-	-	123	156	127	132	-
Do	2	120	125	-	-	-	-	-	-	171	124	130	-	-
Foreign	2	106	102	-	-	-	-	-	-	112	-	-	-	-
Domestic	1	134	-	-	-	-	-	-	-	101	127	-	-	-
Foreign	1	91	99	-	-	-	-	-	-	106	-	-	-	-
Do	3	102	109	-	-	-	-	-	-	108	-	-	-	-

Table H2.--Index of contract awards for power transformers, by values of awards, 1977-81 and January-September 1982--Continued

Period and successful bid (domestic/foreign)	Quantity bid on	Unsuccessful bids												
		Domestic								Foreign				
		1	2	3	4	5	6	7	8	1	2	3	4	5
		Successful bid = 100												
1981:														
Domestic	1	111	103	-	-	-	-	-	-	91	115	119	-	-
Foreign	2	110	102	106	100	125	-	-	-	118	-	-	-	-
Do	1	92	91	99	117	-	-	-	-	-	-	-	-	-
Domestic	2	101	103	105	-	-	-	-	-	-	-	-	-	-
Do	2	101	105	107	-	-	-	-	-	-	-	-	-	-
Do	1	96	128	-	-	-	-	-	-	-	-	-	-	-
Do	4	136	158	97	109	-	-	-	-	155	-	-	-	-
Foreign	2	69	72	92	-	-	-	-	-	112	86	-	-	-
Domestic	1	83	96	-	-	-	-	-	-	-	-	-	-	-
Do	1	132	129	-	-	-	-	-	-	-	-	-	-	-
Do	1	138	126	-	-	-	-	-	-	168	-	-	-	-
Foreign	3	117	131	-	-	-	-	-	-	131	-	-	-	-
Domestic	4	115	104	-	-	-	-	-	-	113	110	112	-	-
Do	1	126	119	-	-	-	-	-	-	140	-	-	-	-
Foreign	1	118	128	-	-	-	-	-	-	120	-	-	-	-
Do	1	125	128	131	-	-	-	-	-	-	-	-	-	-
Do	2	125	128	131	-	-	-	-	-	-	-	-	-	-
Do	2	125	128	131	-	-	-	-	-	-	-	-	-	-
Domestic	2	126	109	153	-	-	-	-	-	134	168	-	-	-
Do	1	122	95	97	-	-	-	-	-	103	-	-	-	-
Do	2	149	-	-	-	-	-	-	-	-	-	-	-	-
Do	2	-	-	-	-	-	-	-	-	129	93	105	93	-
Foreign	1	132	119	151	-	-	-	-	-	128	129	112	174	127
Domestic	1	117	127	-	-	-	-	-	-	117	125	-	-	-
Do	1	119	109	-	-	-	-	-	-	120	109	-	-	-
Do	1	123	106	-	-	-	-	-	-	113	112	-	-	-
Foreign	9	169	202	150	-	-	-	-	-	-	-	-	-	-
Domestic	2	80	95	-	-	-	-	-	-	56	-	-	-	-
Do	3	129	171	-	-	-	-	-	-	102	-	-	-	-
Do	2	115	117	-	-	-	-	-	-	118	-	-	-	-
Do	7	85	99	-	-	-	-	-	-	92	-	-	-	-
Foreign	4	137	-	-	-	-	-	-	-	-	-	-	-	-
Domestic	2	136	-	-	-	-	-	-	-	94	-	-	-	-
Do	3	84	105	-	-	-	-	-	-	94	-	-	-	-
Foreign	1	102	108	-	-	-	-	-	-	91	-	-	-	-
January-September 1982:														
Domestic	1	99	112	106	-	-	-	-	-	132	-	-	-	-
Foreign	1	75	106	-	-	-	-	-	-	132	-	-	-	-
Do	1	100	101	108	115	-	-	-	-	-	-	-	-	-
Domestic	2	80	95	-	-	-	-	-	-	95	-	-	-	-
Do	1	112	115	100	-	-	-	-	-	117	77	-	-	-

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table H3.--Index of contract awards for land, steam turbine generator units, by values of awards, 1978-81

Year and successful bid (domestic/foreign)	Quantity bid on	Unsuccessful bids			
		Domestic		Foreign	
		1	2	1	2
		Successful bid = 100			
1978:					
Foreign	1	103	151	-	-
Do	1	98	139	-	-
1979:					
Domestic	1	84	-	144	-
1980:					
Foreign	1	149	189	145	-
1981:					
Domestic	1	102	-	103	98

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

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APPENDIX I

AN ANALYSIS OF SELECTED U.S.-BASED AND FOREIGN-BASED RAILCAR MANUFACTURES

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U.S.-based rail car manufacturer

The Budd Co.--Budd is a large, diversified, multinational corporation with manufacturing plants in several locations in both the United States and abroad. However, Budd assembles all of its rail passenger cars and car shells in its Red Lion plant in Philadelphia, Pa., although for the New York contract for R-62 subway cars, it planned to use a facility in Hornell, N.Y. Overall sales for Budd in 1981 were in excess of $1 billion. In addition to assembling rail passenger cars, both self-propelled and non-self-propelled, Budd also manufactures automotive parts and assemblies, truck equipment, and other industrial products. Budd also designs and engineers the complete rail passenger car and continues to manufacture two major components, car shells and welded trucks, 1/ and various secondary components, including air ducts, wiring, wiring panels, sash assemblies, and heater guards. Budd's process for manufacturing car shells and truck assemblies and its design and engineering skills have been licensed to various producers around the world. In addition, the components and parts purchased from outside vendors are inspected, tested, and assembled into rail vehicles at Budd's Red Lion facility.

Canadian-based rail car manufacturers

Bombardier.--Bombardier, which has its corporate headquarters in Montreal, Canada, is a publicly held multinational firm which produces recreational and transportation products as well as other industrial equipment. It reported total sales approaching Can $450 million in fiscal year ended January 31, 1982. Its primary business in the early 1970's was snowmobiles, and it is reportedly still the largest producer in the world of this product, albeit for a significantly smaller market. Other products include aeronautical products, logistic equipment (such as trucks for the Canadian Forces), buses, locomotives, and components and parts, including engines and rail passenger cars. Bombardier has assembled rail passenger cars in Canada since the mid-1970's. Outside of Canada, Bombardier is jointly involved in the production of buses with an American partner, General Automotive Corp., in Bombardier Ltd. (Ireland) Bombardier-Rotax Division (Vienna) operates independently in Austria, supplying modern light rail vehicles and more conventional tramways (trolleys) to Vienna, its principal market. In addition, Bombardier operates a facility in Barre, Vt., which performs final assembly operations for rail passenger cars destined for the U.S. market and manufactures certain products for these cars. 2/ Its other manufacturing facility for such cars is located in La Pocatiere, Quebec, Canada. It is devoted entirely to the assembly of rail passenger cars and to the manufacture of car shells and a wide variety of other subcomponents and parts. However, all other major subcomponents, along with many minor parts and components, are obtained from other firms both in Canada and abroad. For

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1/ Budd's welded truck should be distinguished from trucks utilizing castings, which New York is requiring for the R-62 subway cars.

2/ This facility went into operation in 1981 and employed 160 workers in May 1982. The final assembly of the R-62 subway car contract at Barre is expected to increase employment by 150 to 200 jobs. Statement of the Honorable James M. Jeffords of Vermont, before the Senate Committee on Finance, May 28, 1982.

the R-62 subway cars for New York, Bombardier intends to obtain all major subcomponents other than the shell in the United States.

Bombardier's record as a supplier of rail passenger cars is summarized in the following tabulation: 1/

Contract date	Type and number of cars	Purchaser
June 1974	Rubber-tired rapid-transit (423).	Montreal, Quebec.
June 1976	Self-propelled commuter (36).	Chicago/South Suburban (IGGRR).
1978	LRC intercity (10) 1/	Amtrak.
December 1979	LRC intercity (50)	VIA Rail Canada.
June 1980	Commuter (117)	New Jersey. Department of Transportation.
May 1981	Rubber-tired rapid-transit (180).	Mexico City, Mexico.
September 1981	Light rail vehicles (26)	Tri-Met (Portland, Oreg.).
December 1981	Commuter (6)	Metropolitan Transportation Authority (New York).
May 1982	Rapid-transit (825)	MTA (New York).
1982	LRC intercity (50 with options for 100).	VIA Rail Canada.

1/ Supplied under a lease-purchase agreement.

UTDC.--A clear example of foreign government support for rail transit is UTDC. This corporation was incorporated in October 1974. The Special Act of the Ontario Legislature providing for its creation gave it a broad mandate to develop technology for transit systems, including their design, development, construction, testing, operation, manufacture, and sale. The two most well-known projects are the development of the Canadian light rail vehicle (CLRV) and the advanced light, rapid-transit vehicle (ALRT). The CRLV was purchased by the Toronto, Ontario, Transit Commission, and production was awarded to Hawker-Siddeley of Thunder Bay, Ontario, by the Ontario transportation minister, despite Bombardier having submitted the low bid, because of high unemployment in Ontario. The minister stated that the

1/ Bombardier, Inc., annual reports and interview with the following officials of Bombardier, Inc.: Mr. A. Carl Mawby, vice president, Marketing, Mr. P. Andre Roy, vice president, Finance and Administration, and Mr. Roland Gagnon, vice president and general manager. Also present was Mr. Brett A. Schlossberg, attorney, Aug. 20, 1982.

province would pay the additional cost of the higher bid. 1/ The ALRT was developed in phases, with substantial direct funding coming from the Ontario government. For example, UTDC reported that the Ontario government supplied $55 million for phase 3, including the construction of UTDC's Transit Development Centre on a 480-acre site near Kingston, Ontario, which includes facilities for maintenance, laboratories, offices, and training. 2/ UTDC states that such facilities allow it to offer a complete turnkey package in marketing its services and equipment in domestic and international markets. There are test facilities and track for both the CLRV and ALRT. In March 1982, Ventur Trans Manufacturing, Inc., a joint venture company owned equally by UTDC and TIW Industries Ltd., of Trenton, Ontario, began construction near Kingston on a $9 million, 125,000-square-foot plant to build the ALRT. This vehicle uses ultra-modern technology, including linear induction motors (LIM) instead of standard traction motors and a driverless, computerized train control system. According to Railway Age, "The facility will produce the initial 114 vehicles for the Greater Vancouver ALRT. It will also build the vehicles for a 4.4-mile extension of the Toronto Transit Commission's Scarborough line and for the 2.8-mile central automated transit system for downtown Detroit." 3/ Through its subsidiary, Metro Canada Ltd., UTDC is building the Vancouver system on a turnkey basis, i.e., everything from system design and engineering to provision of the rail cars.

UTDC (USA) Inc., a UTDC subsidiary, recently opened an office in Detroit in order to begin work in May 1983 under a contract to the Southeastern Michigan Transportation Authority to provide the first U.S. version of ALRT to Detroit at a cost of $90 million. It is reported that the system will be built in Canada, with many components being of U.S. origin. 4/

The Washington Metropolitan Area Transit Authority recently announced that it had awarded a $260,000 contract to UTDC (USA) of Detroit for design and development of a steerable transit-car-truck. The objective is to design a modification of existing trucks. UTDC Research and Development Ltd. will develop most of the technology, and it currently has steerable trucks designed by it under test at the UTDC Development Center near Kingston, Ontario. 5/

1/ Globe/Mail, July 19, 1977.
2/ UTDC Corporate Report 1977, p. 3.
3/ Railway Age, Aug. 9, 1982, p. 40.
4/ Railway Age, Oct. 25, 1982, p. 8.
5/ Ibid., p. 40.

Italian-based rail car manufacturer 1/

Breda.--Ninety-nine percent of Breda is owned by EFIM (Ente Partecipanioni e Finaziamento Industria Manufatturiera), a state holding company. 2/ Although it is Government owned, Breda contends that since its initial capitalization by the Government, the company has paid taxes on profits and has not been supplemented by the Government for any losses. Breda produces a full line of rail cars, including locomotives, passenger, and freight cars. 3/ The company's production facility, located in Pistoia (near Florence), is reported to be the most modern plant in the world producing rail passenger cars, and is designed to be capital rather than labor intensive. 4/ In 1978, Breda employed approximately 1,000 workers. 5/

1/ The following information is extracted from the Commission's report, op. cit., Rail Passenger Cars and Parts Thereof . . ., Feb. 1980, p. A-16.

2/ Op. cit., Economic Intelligence Unit, p. 40.

3/ Op. cit., Richard J. Barber Assoicates, Inc., p. 8.

4/ Ibid., p. 41.

5/ Op. cit., Economic Intelligence Unit, p. 15.

APPENDIX J

CASE STUDY: RAIL PASSENGER CARS

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Case studies

There are only two known contract awards in which foreign government export credit financing was given. Both involved the Metropolitan Transit Authoritie's (MTA's) puchase of 1,150 R-62 rapid transit cars for the IRT system of the New York City Transit Authority (NYCTA). One contract for 325 cars was awarded in March 1982 to Nissho-Iwai American Corp., representing Kawasaki Heavy Industries, Ltd., of Japan as car builder, the other for 825 cars was awarded to Bombardier, Inc., of Canada in May 1982. The total of 1,150 of such cars is the largest known procurement of one type of rail passenger car in the U.S. market. The order of 825 R-62 subway cars from Bombardier is also the largest ever awarded in the U.S. market to a single car builder.

MTA became involved in receiving foreign government export credit financing after that company examined all the sources of funds available from Federal, State, and local governments to finance a 5-year, $7.9-billion plan for revitalizing MTA's transportation system. The company decided that to meet its goals, it would have to expand funds available from existing sources and to create financing sources not previously available to public mass-transit authorities. Among new possible funding sources were the sale of bonds backed by farebox revenues and the extension of Federal tax laws to allow public transit to benefit from investment tax credit and sale/lease back arrangements available to private transit.

The magnitude of expenditure under this capital program and MTA's lack of an investment grade rating for its bonds at the time underline the bold nature of this undertaking and reinforce the meaning of the following statement taken from MTA's discussion of its funding plans given in the 5-year program.

> Like the capital program itself, the financing of the MTA program is a major undertaking and will be a dynamic process throughout the five year period. Funding will be derived from a number of different sources, each with unique constraints and opportunities. These funds will be applied to a variety of projects with differing schedules of accomplishment and financing. Most of the funding is based on state and federal legislation which were enacted quite recently, and for which there is no established set of precedents. Most significantly, about 60% of all the expected funding is to be raised in the form of long-term bonds and leases, thus subjecting the program to the financial discipline and constraints of competitive capital markets at a time when these markets are suffering unprecedented problems and uncertainties.
>
> Given these broad concerns and some specific matters that will be explored in the course of this section, it will be necessary to maintain a great deal of flexibility in the approach to financing the capital program. 1/

1/ Metropolitan Transportation Authority Capital Program for 1982 through 1986, Sept. 25, 1981, p. III B 2.2.

The MTA also laid out its new rail passenger car acquisition program in detail, as shown in the following tabulation: 1/

Type of car	Quantity	Price including escalation	Years of delivery
	Units	Million dollars	
IRT R-62 Subway cars	1,150	1,377	1983-86
IND/BMT R-68 Subway cars	226	372	1986-87
Commuter cars and SPV's	140	156	1981-83
Commuter cars	272	345	1983-85
Total	1,788	2,250	-

This $2.25 billion represents 30 percent of the overall capital program of $7.4 billion, exclusive of debt service.

Here it seems appropriate to quote from this report concerning MTA's financing strategy with regard to its rolling stock financing.

> In terms of funding sources, it had been the MTA's plan to use federal funds for the primary source of rolling stock financing. However, the attractiveness of the leveraged leasing arrangements make it more appropriate to use that form of financing, and it does not now appear that federal grant funds can be used to generate tax advantages. Thus, the leasing funds must be matched with one of the other sources of MTA financing.
>
> Taking all of these factors into consideration, the most appropriate strategy for major rolling stock financing appears to be a combination of leasing with revenue bonds, negotiated in a way that tailors the terms and availability of the financing (which will be influenced by the types of lenders and lessors interested in tax-free income) with the schedule of needs for financing the equipment. Our strategy would be to seek advance commitments for the full sum required to place an order, but with the drawdown of funds from the lessors and the bond purchasers to come over the total delivery period. Such a long-term commitment may require a high interest rate or a commitment fee in order to secure advance funding under conditions of market uncertainty. Alternatively, the MTA or the car-builder could arrange

1/ Ibid., p. III B 2.16.

> temporary financing during construction to permit optimum timing of the permanent financing. In either case, the assurance of funding and the concomitant ability to place large orders, would be reflected in substantial savings on the price of the cars through economies of scale . . . .
>
> Considerable financial expertise will be necessary to match up these needs with the availability of capital in the marketplace, considering the wide variety of motives and factors affecting the financial markets. However, we have been advised that such placement of much or all of the rolling stock financing may be feasible and are proceeding to test this market. 1/

The final key to MTA's financing strategy involved the leveraged leasing arrangements, often referred to as "safe-harbor leasing," alluded to above. Part of chairman Ravitch's plans to increase funds for mass transit involved extension to public transit of investment tax credit and sale-lease-back arrangements available to private transit. The Economic Recovery Tax Act, passed in early August 1981, extended leveraged leasing for purchases of rolling stock to mass transit. Other capital acquisitions would have to continue being funded from traditional sources. Safe-harbor leasing meant that MTA could, in effect, sell its tax depreciation rights on rail passenger cars and buses to private investors needing a tax shelter. MTA estimated that it should be able to get outside investors to put up 20 to 25 percent of the purchase price for new cars. MTA then sells the cars to the investor and leases the cars with full beneficial use of the cars during the lease agreement. At the end of the lease, MTA buys the cars back for a nominal sum. Meanwhile, the investor can write off the full value of the cars over 5 years, even though it provided only part of the cost. Thus, MTA effectively cuts the purchase price of its cars by 20 to 25 percent.

With these specifics of MTA's plans for capital acquisition and funding strategies in mind, the actual acquisition of cars during 1981 and 1982 can now be discussed.

As MTA developed priorities and strategies, it proceeded with planned purchases. In February 1981, the MTA announced that the Budd Co. submitted the low bid under competitive bidding procedures for 130 M-3 electric, self-propelled commuter rail cars for the Long Island Rail Road (LIRR) and the Harlem-Hudson lines (Conrail). Nissho-Iwai American Corp., a Japanese trading company, acting as prime contractor for a Japanese car builder, Kawasaki Heavy Industries, Ltd., submitted the only other bid, totaling \$188.7 million. In April, a contract was signed for \$142.3 million with a one-time option to purchase up to an additional 208 cars, pricing being based on incremental quantities. MTA exercised this option in April 1982 but reserved the right to cancel 20 to 100 cars, depending on the availability of safe-harbor leasing funds. The total value of the contract plus options was approximately \$350 million. The funds for the initial purchase came from the 1979 TBTA bond

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1/ Ibid., pp. III B 2.17 and III B 2.19.

program noted earlier. No vendor-related financing was sought and none offered; MTA operated under competitive bidding for this contract. The 316 cars represent 18 percent of the value of planned MTA purchases of 1,788 cars and 16 percent of the planned cost of $2.25 billion.

On April 15, 1981, the MTA solicited competitive bids for 325 R-62 rapid-transit cars for the IRT Division of the NYCTA, with options to purchase up to a total of 1,150 cars. The bid procedure followed Federal standards, and the MTA planned to utilize primarily UMTA funds. In the course of the preparation of bids, the MTA became aware that several vendors needed more money up front in the contract, whereas UMTA funding restricts payments to work accomplished at that stage in the contract. The MTA also learned that certain savings in the price per car might be accomplished if Federal funds were not used, such as the utilization of foreign rather than U.S. vessels in shipping to the United States.

On July 15, 1981, the bids were received and considerably exceeded MTA cost expectations. Nissho-Iwai American Corp. (Kawasaki) submitted the low bid of about $894,000 per car. The Budd Co., the only other bidder, asked for $941,000 per car. However, New York State legislation passed in June authorized much greater bonding authority from State and local sources, and safe-harbor leasing was passed at the Federal level in early August.

According to MTA officials, the passage of the safe-harbor leasing tax provisions was a critical landmark in shifting their thinking away from using Federal funds to using other sources. The cumbersome competitive bidding process allowed little flexibility in accomplishing cost reductions and maximizing MTA's leverage as the largest purchaser in the U.S. market buying the largest known order of a single type of car. Because State law also required the use of competitive bidding except for a narrow range of projects, the MTA prepared legislation to allow it to utilize negotiated bidding in its rail passenger car acquisitions. The legislation was passed November 11, 1981, in a special session of the legislature. The legislation was due to expire August 31, 1982, but later was extended until December 31, 1982. Once the law was passed, Nissho-Iwai and Budd were informed that their bids were neither accepted nor rejected. 1/ On November 25, 1981, the MTA issued public solicitation for bids for both the 1,150 R-62 subway cars and for 226 R-68 rapid-transit cars for the IND-BMT Division of the NYCTA, with bids due January 5, 1982.

It soon became clear to both the MTA and the car builders that the burden of continuing negotiations on the R-68 subway cars along with the R-62's would be substantial. By mutual agreement, bidding on the R-68 subway car contract was deferred. Eventually, bids were due June 1, 1982. At that time, Budd submitted a so-called thin-envelop bid which indicated its intention to submit a serious bid later, which it did on July 1, 1982. Budd officials noted that prior to the awarding of the contract of 825 R-62 rapid-transit cars to Bombardier on May 18, 1982, the MTA insisted that vendor-related financing

1/ Interview by Carl F. Seastrum with Mr. Steven M. Polan, special counsel, MTA, and Mr. John D. Simpson, president, NYCTA, also present was Mr. A. Broadus Anderson III, outside counsel, Aug. 11, 1982.

would not be required for the R-68's. However, when approached with the specific question of whether or not such financing should be included after this award by a Budd official, an official of the MTA indicated that Budd should prepare its proposal including such financing. Budd did, obtaining the car shell in Portugal and the truck castings in Brazil. 1/ In October 1982, the contract was awarded to a joint venture consisting of Westinghouse-Amrail. Amrail is an American corporation wholly owned by Francorail. The value of the bids are given in appendix K.

According to MTA officials, it was sometime during late August or early September 1981 that Budd and Nissho-Iwai were informed that the availability of vendor-related financing, from any source, would be important in MTA's decision to award the contract for the R-62 subway cars. At first, MTA officials thought such financing would come from the car builder or from subcontractors; they believed that suppliers of propulsion systems to the airline industry provided vendor financing. In fact, the MTA was so confident of getting negotiating authority from the State, it entered into direct negotiations during September and October with suppliers of several major subassembly systems to ascertain if costs could be reduced and financing obtained. The MTA ultimately decided that its interests were better served by maintaining the prime contractor relationship rather than directly purchasing major subassemblies and supplying them to the car builder. 2/

Budd officials maintained that it was this request for vendor financing which preempted their sourcing decision with regard to where the shell would be produced for the R-62 subway cars. MTA officials alleged they were verbally informed during July 1981 that Budd planned to obtain the shell in either Portugal or Brazil. 3/ However, Budd officials stated that although they realized in July that Budd did not have the capacity to produce the car shells for the R-62's at its Red Lion facility, they still had three options: Budd could open another plant and build the shells itself; Budd could have AVCO, Nashville, Tenn., a large fabricator of stainless steel which had produced car bodies for General Electric (GE), produce the shells; or Budd could obtain the shells overseas. When the MTA requested vendor financing, Budd officials allege the car shell had to be sourced abroad in order to compete with probable Japanese financing. Thus, when Budd made an offer in January 5, 1982, it included obtaining the shell in Brazil or Portugal, at MTA's option, and truck castings obtained in Argentina. Financing packages were available from each foreign source. 4/

In response to MTA's request for vendor-related financing, Budd explored the availability of credit from sources open to it, including investment banks, commercial banks, GE financing, Westinghouse Credit Corp., and its

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1/ Interview by Carl F. Seastrum with Mr. John P. Doane, treasurer, Mr. Charles H. Fitts, manager, Marketing and Sales, Mr. William J. Klippinger, Jr., manager, North American Sales, and Mr. Salem A. Wahby, manager, Foreign Projects, Aug. 18, 1982.

2/ Ibid.

3/ Ibid.

4/ Ibid.

parent corporation, Thyssen. Of these sources, only Westinghouse eventually offered financing from the Brazilian Government for that part of the propulsion equipment obtained in Brazil. Thyssen rejected Budd's request on the grounds that it had never provided financing of this magnitude for so long a duration even on its own products. This would be a bad precedent because Thyssen had so many overseas subsidiaries, and, according to a Budd official, it would place "too many eggs in one basket." Thyssen often used West German Government export credit financing for its exports, but this funding was unavailable unless Budd provided significant West German content. According to the Budd official, the MTA also explored the possibility of New York banks forming a group to finance the cars, but was unsuccessful. 1/

An MTA official verified, for the most part, this sequence of events put forth by Budd officials in his affidavit for the New York court. 2/ Moreover, he added that representatives of the MTA met with representatives of Budd every month between the fall of 1981 and May 1982. "At each meeting, Mr. Ravitch informed the Budd representatives that vendor-related financing was absolutely necessary." Without it, Budd "was in a difficult competitve position." Both he and Mr. Ravitch repeatedly informed officials of Budd of the possible availability of financing through the U.S. Export-Import Bank to match foreign government offers. Mr. Ravitch had even stressed to Budd the possible availability of this financing prior to the award of the contract for 325 cars to Nissho-Iwai. 3/

In addition to Budd, another U.S.-based car builder was interested in bidding on the contract for the R-62 subway cars. During the summer of 1981, Pullman-Standard, following its acquisition by Wheelabrator-Frye in November 1980, considered reentering the rail passenger car business as a prime contractor. Pullman did not bid on the R-62 cars during the April-July 1981 competitive bid period. In anticipation of the MTA reopening bidding, Pullman engaged a large team, including consultants, to prepare a submission. Officials of Pullman met with MTA officials in early October 1981 to present their design and fabrication techniques as well as their approach to the terms and conditions of the contract. They suggested to the MTA that, since it dictated 50 to 60 percent of the design specification components and parts such as propulsion equipment and truck castings, it might purchase some major subcomponents directly from suppliers of these systems and save the cost of Pullman's markup. However, MTA would also assume responsibility for design and liability problems with such articles dictated by it in the specifications.

On December 4, 1981, Pullman stopped work on bid preparation and began to lay off its employees. By July 2, 1982, the rail passenger car division was dissolved and all assets and real estate were sold.

Officials of Pullman stated that three primary factors affected the firm's decision not to complete the bid and meet the January 5, 1982,

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1/ Ibid.

2/ Affadavit of Mr. Steven M. Polan, May 28, 1982, for United States District Court for the Southern District of New York, stipulations 7 and 8, p. 3.

3/ Ibid., stipulations 16 and 17, p. 6.

submission deadline. These were competition from foreign government financing, the technical specifications for the cars, and the terms and conditions of the contract. They indicated that the decision was heavily weighted by the reported availability of foreign government export credit financing at an interest rate of about 9.5 percent. They stated that without this factor, Pullman would have submitted a bid and tried to negotiate with regard to the other two factors. However, they emphasized that the design, bid, and manufacturing process is onerous and was important. 1/

When questioned about Pullman's participation in the bidding process, officials of the MTA said that, in their view, Pullman never presented a serious offer, because it was unwilling to submit a fixed-price bid; its bid was only on a cost-plus basis. Also, the problem of liability risk could not be resolved. These officials felt that Pullman's bid must be viewed in the context of the MTA's ongoing litigation at the time over problems with the R-46 subway cars supplied by Pullman in the mid-1970's. As part of its effort to resolve this litigation, MTA officials believed the evolution of discussion led to Pullman making a proposition on the R-62 subway cars. In addition, these officials stated, Pullman had been informed of the need to provide vendor-related financing, but the MTA had not received any formal offers and was not aware of, or requiring or suggesting, any specific interest rate levels. The availability of financing was emphasized in order to provide the MTA with the ability to buy the cars. 2/

This brings the discussion to the submission of bids on the January 5, 1982, deadline. According to officials of the MTA, they received the first formal offer of seller-supplied foreign government export credit financing in Nissho-Iwai's letter, dated December 22, 1981, which arrived at the MTA on December 29, 1981. This offered financing for only 325 cars at the prevailing Organization of Economic Cooperation and Development (OECD) guidelines rate for relatively rich countries, the U.S. and Japan both agreeing to these guidelines. Budd's financing offer was noted earlier. Although Bombardier, Inc., and Francorail, a consortium of French industrial firms, entered bids, they were so-called thin-envelop bids which merely indicated that they intended to submit serious proposals at a later date. This is not surprising, since both entered the bidding only at the request of the MTA in the fall of 1981 as it sought to interest as many car builders as possible in the contract. 3/ An MTA official testified that Francorail's and Bombardier's first intentions were made known formally as follows: 4/

1/ Separate telephone interviews conducted on July 27, 1982, with Mr. Jack R. Kruizenga, President, Pullman-Standard, Inc., and Mr. Bob Long, former director of Contract Management at Pullman, and after July 6, 1982, Manager of Current In House Programs, the Budd Co.

2/ Interview by Carl F. Seastrum with Mr. Steven M. Polan, special counsel, MTA, and Mr. John D. Simpson, president, NYCTA, also present was Mr. A. Broadus Anderson III, outside counsel, Aug. 11, 1982.

3/ Ibid.

4/ Polan affidavit, Op. cit., stipulations 19 and 20, pp. 7 and 8.

On February 25, 1982, a full and specific offer was received from Francorail. This submission, which clarified previous communications from Francorail, offered financing of 85% of the French content of the car at the rate of 8.5% payable over 5 years beginning 6 months after first delivery (to the 8.5% was added .5% insurance fee and .7% exchange rate risk allocations, resulting in 9.7% financing). This offer was not modified for several months.

Bombardier made its first detailed proposal on March 3, 1982. This proposal contained a letter from the Export Development Corporation of Canada which offered financing of 85% of the entire content of the contract. The interest rate offered was 9.5% for the first 400 cars and 11.75% for the second 425 cars, payable over 5 years beginning 6 months after the first 12 months of delivery (i.e., a slightly better repayment period than that offered by the French).

Although the MTA had offered the entire 1,150 R-62 subway car order as a package, it became increasingly clear to the MTA that it should separate 325 cars from that total. The critical operating needs of the IRT system made early delivery of a portion of the R-62's important. According to officials of the MTA, certain factors pointed toward awarding the initial 325-car contract to Nissho-Iwai. Engineering design work had gotten to the point where a prototype stainless steel car body structure was built in preparation for production design. MTA officials were impressed with Kawasaki's production facilities and with the enthusiasm and competence of Kawasaki's engineering team. In contrast, it did not appear that Budd had progressed very far with its engineering concepts. Finally, Nissho-Iwai offered much more favorable financing. Since the New York State negotiating legislation allowed the MTA to purchase up to 325 cars under expedited procedures, because of its critical delivery needs, it went ahead on that basis. Thus, some of the other factors, such as the amount of New York State content, which will be noted as important considerations in the awarding of the contract to Bombardier, received less emphasis in the awarding of this contract. 1/

On March 8, 1982, the MTA mailed a notice of public hearing to all bidders notifying them of its decision to purchase the first group of 325 cars from Nissho-Iwai and Kawasaki. On March 17, 1982, the MTA released a summary of the agreement with Nissho-Iwai and a background memorandum, "Foreign Procurement of Rolling Stock by the Metropolitan Transportation Authority," explaining the circumstances which led it to purchase rail passenger cars from a car builder outside the United States. In the memo, the MTA explained that, although Budd offered the lowest price per car for the entire 1,150-car order, this would be more then offset by cost escalation due to inflationary factors

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1/ Interview by Carl F. Seastrum with Mr. Steven M. Polan, special counsel, MTA, and Mr. John D. Simpson, president, NYCTA, also present was Mr. A. Broadus Anderson III, outside counsel, Aug. 11, 1982.

resulting from the fact that the final delivery of all cars would be in 1987. For the 325 cars alone, Nissho-Iwai promised the fastest delivery and the delivery of all cars by June 1985. A 10-car test train would be delivered in December 1983. 1/ It also submitted the lowest price per car bid for this smaller order, lowering its price from $893,900, offered July 15, 1982, to $844,500, or a total contract price of $274,462,500. All of these prices are exclusive of escalation. The MTA announced that Budd had planned to manufacture major subcomponents, including the car shells, outside the United States.

With regard to the financing, the contract called for a supplier's credit from the Export-Import Bank of Japan. That institution would lend money to Kawasaki, which would, in turn, lend it to the MTA. The amount involved was 45.96 percent of the total contract price, or $126,142,965, plus escalation. The money was lent in Japanese yen at an effective interest rate of 9.0 percent per annum. To cover the exchange-rate risk, Kawasaki added $40,400 per car to the cost of its loan to the MTA, increasing the effective interest rate to 12.25 percent per annum (as announced by the MTA).

The present value of the Budd and Nissho Iwai offers are shown in table J1. These present values are calculated at an assumed market interest rate of 14 percent, the rate MTA felt that it might have to pay on its bonds. Nissho Iwai's financing reduced the present value of its bid by $10 million or 3.7 percent. The present value of Nissho Iwai's bid was $300,000 or .1 percent below Budd's bid.

Table J1.--Rail passenger cars: Present value of the Budd and Nissho-Iwai contracts under different assumptions concerning financing

Financing	Present value		Different in present value	
	Budd	Nissho Iwai	Value	Share
	Million dollars			Percent
As in Bid	258.9	258.6	0.3	0.1
None	1/	268.6	1/	1/

1/ Not available.

Source: Estimated by the staff of the U.S. International Trade Commission.

1/ Recently, MTA officials noted that this 10-car train will arrive 4 months ahead of schedule, New York Times, Aug. 30, 1982, p. A1.

With regard to U.S. manufacturing content, the MTA insisted on 43 percent being obtained from U.S. manufacturers. In order to obtain Government financing, Kawasaki had to obtain at least 50 percent of the car in Japan. In addition, Nissho-Iwai's final offer, as accepted, agreed to procure or produce components worth $31,300 per car within New York State compared with Budd's offer of $4,770 per car. 1/

Following the public hearing on March 23, 1982, the MTA board approved the contract. New York State law required submission to the Public Authorities Control Board for review; and, when it did not disapprove within 15 days, the contract was deemed to have been approved. The loan to Kawasaki by the Export-Import Bank of Japan also received approval from the Ministry of International Trade and Industry. However, the MTA announced in October 1982 that it had decided to cancel the loan and use bonds backed by its revenues because of the favorable interest rates it had received on recently issued bonds. 2/

With the contract for the first 325 cars out of the way, the MTA could focus on negotiations for the remaining 825 R-62 subway cars. The first formal offers made by Francorail and Bombardier have already been noted. However, in contrast to the Japanese financing, the Canadian financing was a buyers credit negotiated directly between the Export Development Credit Corporation (EDC) of Canada, a Government agency, and the MTA. Bombardier referred the MTA to the EDC when the MTA sought vendor-related financing. It appears that the French, in making their offer, believed they were being forced to match the Japanese offer for the entire 1,150 cars.

The U.S. Department of the Treasury staff concluded in its memorandum on the financing of the New York City subway cars that--3/

> The exchanges between Canada and France seem to have taken place at a time when the MTA was bargaining intensively with all bidders over terms . . . Given the detailed documentation France has provided . . . and the incomplete evidence on the Canadian side, the conclusion seems inescapable that the Canadians were the first to break ranks. They appear to have been pressured by MTA negotiatiors into offering progressively more favorable financing in order to forestall a possible loss of the contract to Francorail. The French, on the other hand,

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1/ Letter from Mr. Steven M. Polan, special counsel, MTA, to Mr. Carl F. Seastrum, Commission staff, Aug. 12, 1982.

2/ The New York Times, Oct. 18, 1982, p. D7. The MTA planned to sell 100 million dollars worth of revenue bonds on its first issue but was so successful, it marketed $250 million at an average interest rate of 9.7 percent. The Wall Street Journal, Oct. 18, 1982, p. 43.

3/ U.S. Department of the Treasury, "Financing of New York City Subway Cars: Treasury Department Investigation Under Section 1912, Export-Import Bank Act," p. 6, Financing of Subway Cars for the Metropolitan Transportation Authority of New York, July 13, 1982.

> appear, on the basis of their detailed recitation of dates, telex numbers, and texts, to have made serious efforts to respect the Arrangement, derogating only when Canada did so."
>
> It is clear that the French financial competition was never as severe as the Canadians believed, and that more scrupulous attention to the exchange of telex information with French authorities could have resulted in Canadian financing at no more favorable terms and conditions than those specified by the Arrangement.

The MTA first had the bidders concentrate on the financing in order to obtain the maximum amount available. Later, emphasis would be placed on lowering the price per car. On May 14, 1982, the MTA informed the bidders that they should submit their final price per car on May 17, 1982, after which negotiations would be closed. According to the MTA, Budd lowered its price per car slightly, and both Bombardier and Francorail lowered their prices substantially. 1/

On May 18, 1982, the MTA announced the purchase of 825 R-62 subway cars at a cost of approximately $663 million plus escalation. The funding was primarily provided by a loan from the EDC of Canada, which was announced at about $563 million, or 85 percent of the total contract price, plus escalation, at a 9.7-percent rate of interest. 2/

In a summary of the proposed contract released June 8, 1982, the MTA listed the price per car offered by Bombardier at $798,770 (compared with its original submitted offer of $921,000 per car). The loan from the EDC to the MTA required a commitment fee of 0.5 percent per annum on the unused balance and a flat 0.5-percent administrative fee. The security was, as with the Kawasaki loan, pari passu with bondholders under the MTA special obligation bond resolution. The term loan arranged for payments to be made, when authorized by the MTA, coincident with progress payments made under the contract. Repayment would be made in 20 equal semiannual installments, beginning 6 months after the delivery of the final car. A 10-car test train would be delivered in July 1984, and the final car would be delivered in May 1987. The final maturity of the loan would be in 1997.

However, Budd was able to offer Government export credit financing on only 17 percent of the contract price. The Brazilian financing, which covered the truck castings and the part of the propulsion equipment manufactured in Brazil, would be provided at 8.5 percent, with repayment over 9 years. The financing on the car shell obtained in Portugal would be at 10.25 percent,

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1/ Polan affidavit, op. cit., stipulation 25, pp. 9-10.

2/ On Nov. 15, 1982, the MTA and EDC announced the signing of an agreement to borrow the funds which could, including escalation, amount to US $750 million, The Wall Street Journal, Nov. 16, 1982, p. 45.

with repayment over 5.5 years. Other details of the Budd offer will be covered later.

Francorail, the only other bidder, offered the same financing as that of Bombardier. It reduced its original offer price per car from $867,000 to $814,000. Final delivery would be in April 1987, and New York State content would be 8 percent of the cost of the car.

According to the MTA, its decision to award the contract to Bombardier was contingent upon seven major factors: 1/

1. The availability of government-supported financing from the vendors;

2. The cost of the financing;

3. The price of the cars;

4. Delivery schedules, including reliability of delivery;

5. Quality of design, engineering, and performance, including compatibility with Japanese-built cars already ordered by the MTA;

6. Possible overdependence on a single supplier; and

7. New York State content.

The MTA judged Bombardier's final offer superior on all seven criteria, with the possible exception of price. In its August 1982 report, the Commission discussed each of these points. This discussion was as follows: 2/

> Price.--Bombardier's price per car is $798,770. Budd's offer price per car is $770,768; however, MTA believes that certian other charges must be included in Budd's price. Two minor adjustments bring Budd's price to $776,648 per car, 2.8 percent lower than Bombardier's price. MTA told all bidders that it wished to retain 3.0 percent of the total contract price until it had finally accepted all the cars. Budd's bid included a price increase of $2,061 per car, if the MTA insisted on this provision. Furthermore, MTA asked each bidder for price quotes that included braking components from New York Air Brake. Bombardier stated that it would use New York Air Brake's components at no extra charge to the MTA.

1/ U.S. Department of the Treasury Staff Memorandum, op. cit., p. 1.

2/ Certain Rail Passenger Cars, USITC Publication 1277, August 1982, pp. A-9-A-14.

Budd stated that if it used New York Air Brake's components, its price would be $3,819 higher per car.

Budd's offer price also assumes that the under carriage that will be manufactured by Equipamentos Villares in Brazil will pass New York City Transit Authority (NYCTA) qualification tests. If the NYCTA does not accept the Villares truck, then Budd will increase its price by $23,237 per car. This additional charge would bring Budd's price up to $799,885, 0.1 percent higher than Bombardier's price. Villares, a licensee of Budd and Westinghouse Electric, has successfully supplied trucks for the Sao Paulo and Rio de Janeiro subway systems. Budd contends it has no doubt that the NYCTA would find the Villares truck acceptable. 1/

Financing.--Both the availability and the terms of financing were important to the MTA . . .

Bombardier offered to finance 85 percent of the value of the contract over a 10-1/2 year period at a 9.7-percent rate of interest. Budd offered financing of 17 percent of the value of the contract over a 9-1/2-year period at a weighted average interest rate of 9.2 percent . . . Thus, Bombardier offered to finance a much larger part of the contract than did Budd."

Present value.—As previously stated, the MTA compared the costs of the Bombardier and Budd railcars by comparing present values. The present value is the amount of money that if paid today would be equivalent to a schedule of future payments, assuming that the firm faces a given rate of interest.

The MTA and Morgan Bank, its financial advisor, calculated the present value of payments in the Budd and Bombardier contracts under a variety of different assumptions. The results of these calculations are shown in table 3. Given the financing terms in each firm's bid, the present value of Bombardier's contract was $517 million dollars, 6.5 percent lower than the present value of Budd's contract. Had neither firm offered any financing, the present value of Bombardier's contract would have risen to $598 million dollars, 5.1 percent higher than Budd's.

1/ Testimony of John Doane, treasurer of Budd, at the MTA hearing, June 10, 1982, p. 115. Budd officials subsequently noted that if the Villares truck was not found acceptable, its price to the MTA would not change. Budd would not be responsible for supplying an acceptable truck and would have to seek compensation from Villares. Interview by Carl F. Seastrum with Mr. John P. Doane, treasurer, Mr. Charles H. Fitts, Manager, Marketing and Sales, Mr. William . Klippinger, Jr., manager, North American Sales, and Mr. Salem A. Wahby, manager, Foreign Projects, Aug. 18, 1982.

Table 3.--Subway cars: Value of the Budd and Bombardier contracts under different assumptions concerning financing

Financing	Present value		Difference in present value	
	Budd	Bombardier	Value	Share
	--------Million dollars-------			Percent
As in Bid	553	517	36	6.5
None	569	598	(29)	(5.1)
As in arrangement 1/	560	570	(10)	(1.8)

1/ "International Arrangement on Export Credits" of the Organization of Economic Cooperation and Development.

Source: Estimates done by the Metropolitan Transit Authority, Morgan Bank and the U.S. Department of the Treasury.

Had the financing offered by Budd and Bombardier conformed to the minimum terms of the "International Arrangement on Export Credits" of the Organization of Economic Cooperation and Development (OECD), Bombardier's financing would be limited to 85 percent of the Canadian content of the cars; its interest rate would be 11.25 percent, and repayment would be required in 8.5 years. Adherence to these terms would raise the present value of Bombardier's bid to $570 million dollars and the present value of Budd's bid to $560 million dollars. Thus, were the arrangement terms to be followed, the cost of the Bombardier contract would be 1.8 percent higher than the cost of the Budd contract.

Bombardier's financing package reduces the present value of its contract by $81 million, or 13.5 percent, as shown by the date in table 3. However, if the MTA had to finance its purchase of the Bombardier subway cars through market rather than Bombardier's financing, total interest payments over the life of the contract would be $241 million dollars higher. 1/ The apparent disparity between these two numbers is caused by the way present value is calculated. The total reduction in interest payments is the simple sum of the difference in interest payments in each year; the reduction in present values is the weighted sum of the differences in payments. The weights used in present-value calcula ons are all less than one, so their use reduces the al lute dollar amounts involved.

1/ This figure was calculated by the staff of the U.S. Department of the Treasury. Like the present-value calculations, this figure assumes the MTA faces a 14-percent market rate of interest.

Present-value calculations are based on certain assumptions. The major assumptions involved in these calculations concern the price of the Budd cars, the market interest rate the MTA faces, and the amount of escalation in each contract.

The present values in table 3 are based on a Budd price of $776,648. This price includes additional charges for the MTA's retention requirement and for the use of New York Air Brake components, but does not include the extra charge were the MTA to find the Villares truck unacceptable. If Budd were unable to use this truck, its price per car would increase by $23,237, so the present value of its contract would rise by $16 million. This increase does not include the effects of the loss of the Brazilian export credit on these trucks; that loss would further increase the present value of Budd's contract. 1/

These present-value calculations also assume that the MTA faces a 14-percent rate of interest. The portion of each bid that is not financed by the seller (sic) is assumed to be financed by the issuing of bonds at 14 percent. However, if the MTA had to issue bonds to raise the large amount of additional financing needed for subway purchases, the interest rate on those bonds might increase. A higher rate of interest would make Bombardier's seller (sic) financing more valuable. For example, at a 15-percent interest rate, Budd's present value is $537 million and Bombardier's present value is $490 million, 8.8 percent lower than Budd's. 2/

The third assumption concerns the amount of escalation in each contract. Because delivery under both the Budd and Bombardier contracts will not be completed for several years, each contract contains an escalation clause that adjusts the final price of the cars upward with movements in U.S. Government indexes of wages and material prices. The escalation clauses in the two contracts are different. Budd's escalation clause applies to a slightly higher percentage of the contract value than Bombardier's, but Bomabrdier's escalation clause places comparatively greater weight on the labor-cost index. Wages will probably rise faster than material prices. The present value estimates assume that wages increase at an 8.5-percent annual rate while material costs increase at an 8.0 percent annual rate. The MTA's estimate of the present value of Budd's bid includes $117 million in extra

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1/ See footnote to price section above in which Budd contends it would not increase the price by $23,237.

2/ As noted above, MTA entered the bond market in Oct. 1982, and sold $250 million of bonds at an average interest rate of 9.7 percent.

costs due to the escalation clause, 21.2 percent of the total value of $553 million. The MTA's estimate of the present value of Bombardier's bid includes $133 million in extra costs due to the escalation clause, 25.6 percent of the total value of $520 million.

Other factors

The MTA considered several factors other than price and financing when choosing between Budd and Bombardier. These factors are delivery schedules, New York State content, compatibility with other MTA equipment, and a desire not to be overly dependent on any single supplier for major items of equipment that are critical to the operations of the transit system.

Budd promised both to start and to complete delivery before Bombardier. . . The MTA officials, however, stated that they felt Bombardier, was more likely to adhere to its delivery schedule, because Bombardier has recently been more reliable in delivering subway cars on time than has Budd. The MTA was particularly concerned that Budd's deliveries would be late, because Budd would assemble the cars in a plant at Hornell, N.Y., that had not previously been used to assemble railcars. 1/ Budd insisted that if the Hornell plant were used for assembling the cars, the MTA waive damages for the first two months of delay.

The MTA estimated that the New York State content of Budd's cars was 12 percent of their cost. The New York State content of Bombardier's cars was 16 percent of their cost, and Bombardier promised to try to raise that to 20 percent. In New York State, the Budd contract would generate 2,340 years of employment; the Bombardier contract would generate 2,384 years of employment. 2/ Budd contends that MTA's estimates of its New York State content are too low, because if it uses New York Air Brake components, its New York State content will be approximately 19 percent. 3/

Bombardier's cars have the advantage of being compatible with 325 cars the MTA has already ordered from Kawasaki. Bombardier will produce its cars using a design licensed

1/ Testimony of John Simpson, president of the NYCTA, before the MTA, June 10, 1982, pp. 29-36.

2/ Estimates of employment are from the New York State Department of Commerce.

3/ Testimony of John Doane, op. cit., pp. 116-117.

from Kawasaki. This similarity of design will reduce MTA's maintenance costs. 1/

The MTA also wants to increase the number of sources for its equipment. It recently made a substantial purchase of commuter cars from Budd. By ordering from Bombardier, the MTA increases its number of suppliers for equipment in general and for cars following the Kawasaki design in particular. A memorandum which the MTA submitted to the New York State Public Authorities Control Board summarizing its consideration of the proposals in terms of its most important criteria is shown in appendix E (appendix L of this report).

The MTA, in its contract with Bombardier, has agreed that if a countervailing duty order should be issued, the financing agreement with the Canadian Government will be modified in such a way to offset or eliminate any net subsidy which is found to exist. 2/ According to the MTA, it is willing to take such steps to offset a subsidy, because it believes Bombardier's proposal is worth accepting even at a higher cost. 3/

1/ Testimony of John Simpson, President of NYCTA, op. cit., p. 26.
2/ Transcript of conference, p. 138.
3/ Ibid., p. 139.

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APPENDIX K

U.S. RAIL PASSENGER CAR PROCUREMENT, JANUARY 1977-NOVEMBER 1982

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Table K1.--U.S. rail passenger car procurement, by specified periods, Jan. 1977-November 1982

Period of order	Purchaser	Number and types of cars	Builder/bidders	Value of award/ bids	Average price per car
				Million dollars	1,000 dollars
January 1977	West Suburban Mass. Transit District.	20-bilevel gallery.			
		2-option			
	Chicago Regional Transit Authority (RTA).	$\frac{50}{72}$-bilevel locomotive hualed commuter.	Budd 1/	32.9	457
			Pullman-Standard		
April 1977	Delaware River Port Authority/Lindenworld, N.J. (PATCO).	46-self-propeled heavy rail subway rapid-transit.	Canadian-Vickers 1/	33.6	730
April 1977	Long Island/Jersey Arrow (Conrail).	50-self-propeled commuter.	G.E. 1/	40.0	800
October 1977	Greater Cleveland Regional Transit Authority (GCRTA).	48-self-propeled light rail vehicle.	Breda 1/	31.0	646
			UTDC	2/ 28.8	
			Budd/UTDC	32.5	
			Pullman	34.4	
			Nissho	34.5	
			Budd/UTDC	34.7	
			Duwag	34.8	
			Nissho	35.3	
			Burgedise	36.2	
			Nissho	36.5	
			Burgedise	36.6	
			Burgedise	37.6	
			Burgedise	37.7	
			Hawker	38.4	
			Hawker	40.2	
			Boeing	44.9	
			Bombardier	45.0	
			Boeing	47.1	
			Boeing	51.9	

See footnotes at end of table.

Table K1.--U.S. rail passenger car procurement, by specified periods, January 1977-November 1982--Continued

Period of order	Purchaser	Number and types of cars	Builder/bidders	Value of award/ bids	Average price per car
				Million dollars	1,000 dollars
October 1977	RTA (Chicago Regional Transit Authority).	30-bilevel diesel-hauled.	Budd 1/	15.3	510
December 1977	MBTA (Massachusetts Bay Transit Authority).	25-commuter locomotive hauled.	Pullman-Standard 1/	10.8	432
			Budd	13.8	
1977	MARTA (Metropolitan Atlanta Rapid Transit Authority).	20-self-pro-peled rapid-transit.	Franco-Belge 1/	3/ 11.2	560
			G.E.		
July 1978	MBTA (Massachusetts Bay Area Transit Authority).	35-diesel-hauled commuter.	Pullman-Standard 1/	15.1	431
December 1978	CTA (Chicago Transit Authority).	300-heavy rail rapid-transit.	Budd 1/	133.3	444
			Boeing-Vertol	174.9	
			Pullman-Standard	248.0	
February 1979	SEPTA (S.E. Penn. Transit Authority).	141-light rail vehicle.	Nissho-Iwai 1/	57.7	409
			UTDC	2/ 61.5	
			Breda	68.5	
			Hawker-Siddeley	77.4	
			BN	81.3	
			Budd	84.0	
February 1979	Metro Dade Country Transit Miami.	136-subway rapid-transit.			
	MD. DOT (Baltimore Mass Transit Authority).	72-subway			
		208-rapid-transit.	Budd 1/	145.4	699
April 1979	San Diego Metropolita Transit Developmant Board.	14-light rail vehicle.	Siemans-Duwag 1/	11.8	663
July 1979	WMATA (Washington Metro. Area Transit Authority).	94-subway	Breda 1/	76.4	813
			Hawker-Siddeley	92.4	
			Budd	103.3	

See footnotes at end of table.

Table K1.—U.S. rail passenger car procurement, by specified periods, January 1977-November 1982--Continued

Period of order	Purchaser	Number and types of cars	Builder/bidders	Value of award/ bids	Average price per car
				Million dollars	1,000 dollars
July 1979	State of Connecticut	13-SPV/2000 self-propeled commuter.	Budd 1/	12.9	992
March 1980	SEPTA (S.E. Penn. Transit Authority), Philadelphia.	110-rapid-transit.	Nissho-Iwai 1/	68.2	573
			Hawker-Siddeley	76.1	
			Fiat	79.0	
			Budd	81.4	
March 1980	SEPTA (S.E. Penn. Transit Authority), Philadelphia.	15-rapid-transit (option).	Nissho-Iwai 1/	8.3	555
March 1980	Amtrak (National RR Passenger Corp.).	150-low-level intercity.	Budd 1/	117.4	783
July 1980	NJDOT (New Jersey Department of Transportation).	57-diesel-hauled commuter.	Bombardier 1/	43.0	738
			Budd 1/	38.0	
September 1980	Chicago-Northern Indiana Commuter Transit District (NICTD) for Chicago South Shore & South Bend Railroad (CSS & SBRR).	36-self-propeled commuter.	Sumitomo 1/	33.5	932
			Budd	38.6	
December 1980	NJDOT (New Jersey Department of Transportation).	60-diesel-hauled commuter (option). 5/	Bombardier 1/	42.1	726
February 1981	NFTA (Niagara Frontier Transportation Authority), Buffalo.	Light rail vehicle. 4/			
		33	Tokyu Car 1/	21.8	630
		33	UTDC	22.9	
		27	Siemens-DuWag	25.3	
		25	Bombardier	26.4	
		25	Hawker-Siddeley	30.4	
February 1981	SDMTDB (San Diego Metropolitan Transit Development Board).	10-light rail vehicle (option).	Siemens-DuWag 1/	9.3	878

See footnotes at end of tables.

Table K1.--U.S. rail passenger car procurement, by specified periods, January 1977-November 1982--Continued

Period of order	Purchaser	Number and types of cars	Builder/bidders	Value of award/ bids	Average price per car
				Million dollars	1,000 dollars
February 1981------	MTA (New York Metropolitan Transportation Authority).	130-self-propeled M-3 commuter.	Budd 1/-------------	142.3	944
			Nissho-Iwai---------	188.7	
June 1981----------	WMATA (Washington Metro Area Transit Authority).	200-rapid-transit (option). 6/	Breda 1/------------	7/ 59.3	7/ 847
				8/ 31.3	8/ 869
				9/ 53.9	9/ 898
				10/ 31.6	10/ 925
August 1981--------	GCRTA (Greater Cleveland Regional Transit Authority).	60-rapid-transit.	Tokyu Car 1/--------	53.1	886
			C. Itoh & Co. (Hitachi).	70.2	
September 1981-----	Tri-Met (Tri- Country Metropolitan Transportation District), Portland.	26-light rail vehicle.	Bombardier 1/-------	21.7	776
			Siemens-DuWag-------	26.0	
October 1981-------	CTA (Chicago Transit Authority).	300-heavy rail rapid-transit (option).	Budd 1/-------------	133.3	444
January 1982-------	MD. DOT (Baltimore Mass Transit Authority).	28-rapid-transit (option).	Budd 1/-------------	19.6	699
March 1982---------	Chicago-Northern Indiana Commuter Transit District (NICTD) for Chicago South Shore & South Bend Railroad (CSS & SBRR).	8-self-propeled commuter (option).	Sumitomo 1/---------	10.0	1,246
March 1982---------	MTA (New York Metropolitan Transportation Authority).	325-rapid-transit.	Nissho-Iwai 1/------	274.5	845
			Budd----------------	280.3	
April 1982---------	MTA (New York Metropolitan Transportation Authority).	186-self-propeled M-3 commuter (option).	Budd 1/-------------	175.6	944

See footnotes at end of table.

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Table K1.--U.S. rail passenger car procurement, by specified periods, January 1977-November 1982--Continued

Period of order	Purchaser	Number and types of cars	Builder/bidders	Value of award/ bids	Average price per car
				Million dollars	1,000 dollars
May 1982	MTA (New York Metropolitan Transportation Authority).	825-rapid-transit.	Bombardier 1/	659.0	799
			Budd	10/ 659.9	11/ 800
			Francorail	671.6	814
July 1982	PAT (Port Authority of Allegheny County-Transit), Pittsburgh.	55-light rail vehicle.	Siemens-DuWag 1/	53.3	898
			UTDC	57.4	
			Tokyu Car Corp	59.2	
			Kinki Sharyo Car	62.8	
September 1982	MARTA (Metropolitan Atlanta Rapid Transit Authority).	30-rapid-transit.	C. Itoh & Co. (Hitachi). 1/	35.5	1,182
			Mitsui (Tokyu Car)	37.4	
			Sofer val (ALSTOM)	39.2	
			Budd Co	43.0	
October 1982	MTA (New York Metropolitan Transportation Authority).	225-rapid-transit.	Westinghouse-Amrail. 1/	205.9	915
			Budd	224.4	
			Sumitomo	231.5	
October 1982	BART (Bay Area Rapid Transit).	150-rapid-transit.	SOFERVAL 1/	183.8	1,225
			Francorail	186.4	
			Budd	228.3	
			C. Itoh & Co. (Hitachi).	248.4	
			Tokyu Car	253.5	

1/ Winner of contracts.
2/ This bid was found to be not responsive because it did not meet design specifications.
3/ Estimated by the staff of the U.S. International Trade Commission.
4/ Bids were based on moving a certain number of passengers within a given time. This resulted in bids with varying numbers of cars of different sizes.
5/ This includes 2 cars sold to NJDOT for a total of $1 for exercising its purchase option of 58 cars allowed under the contract within a certain time period. Average price per car is based on 58 cars.
6/ Option for 200 rapid-transit cars was exercised subject to availability of Federal funds.
7/ Lot No. 1 of 70 cars has had federal funds made available.
8/ Lot No. 2 of 36 cars has had federal funds made available.
9/ Lot No. 3 of 60 cars has until Dec. 28, 1982, for final option to be exercised.
10/ Lot No. 4 of 34 cars has until Dec. 28, 1983, for final option to be exercised.
11/ These are the data released by the MTA when it awarded the contract. Budd alleged that its true bid was $770,768 per car, or $635.9 million.

Source: UMTA, Amtrak, various purchasers, the Budd Co., and various issues of Railway Age, except as noted.

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APPENDIX L

MTA - BOMBARDIER SUBWAY CAR CONTRACT AWARD

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MEMORANDUM RE:

MTA-BOMBARDIER SUBWAY CAR CONTRACT AWARD

This memorandum summarizes the basis of MTA's decision to award a subway car contract for 325 R-62 subway cars to Bombardier, Inc. This contract represents the largest single procurement in a largely locally funded, $7.9 billion program to rebuild the New York public transportation system over the next five years.

In the summer of 1981 MTA received competitive bids for 325 IRT subway cars. The low bid was $895,000 per car, which in MTA's judgment was excessive. Questions were also raised at that time as to MTA's ability to market bonds in excess of $1.2 billion in the time frame required to fund the purchase of the full planned order of 1,150 cars. MTA then sought State legislation to authorize negotiation for the purchase of subway cars. It made this proposal for two principal reasons: first, to reduce the price of the cars, and second, to attract sufficient vendor related financing on favorable terms to assure that payments under any subway car contract could be met without sacrificing other elements of the capital program.

Over the past several months MTA negotiated with three subway carbuilders: Bombardier, a Canadian firm; Francorail, a consortium of French industrial companies; and the Budd Co., a wholly owned subsidiary of the Thyssen Company of Germany. These negotiations followed the award of a negotiated contract for 325 R-62 subway cars to the Nissho Iwai American Corporation, representing Kawasaki Heavy Industries.

MTA's objectives in this negotiation, consistent with State law, were to purchase the highest quality car with the fastest possible delivery, to effect the greatest possible savings taking account of both car price and vendor related financing, to maximize the content of the car manufactured within the State of New York, consistent with considerations of manufacturing capacity, economic benefits and technical objectives, and to afford MTA the greatest protection against potential risks in contractor performance. MTA's ultimate decision to award to Bombardier was based on the Authority's judgement that Bombardier's offer was, with respect to each of the factors noted above, either superior to or the equivalent of the offers of its two competitors.

With respect to both price and financing, Bombardier offered the most advantageous terms. Its car price ($798,770 per car) was below that of Francorail's and roughly equal to Budd's (based on equivalent contractual options). The amount of financing offered by Canada's Export Development Corporation (85% of total contract price with repayment over ten years) was the most favorable offer, and an extremely important consideration in MTA's willingness to commit to a contract of this magnitude. In contrast to the availability of financing, the favorable interest rate (9.7% p.a.), while providing substantial and important economic benefits to MTA, and providing the basis for Bombardier's equality with Francorail was not the central factor in choosing Bombardier. Given MTA's need to raise more than $4 billion in public market financing over the next five years and the pressure this will place on all New York State and City agency borrowings, availability of the EDC financing offer is a most significant factor.

With respect to car quality and overall confidence in carbuilder engineering, MTA had a clear preference for the Bombardier offer, and this was a substantial factor in MTA's decision. Bombardier had entered into a licensing agreement with Kawasaki Heavy Industries, so that the Bombardier cars would be substantially identical to the Kawasaki cars the MTA has already committed to purchase. MTA's evaluation of Kawasaki's work thus far is extremely favorable, and similar engineering offers the MTA the advantage of compatibility with other new cars in the IRT fleet, with consequent beneficial impacts on maintenance and parts inventory requirements.

While Budd promised a slightly faster delivery-schedule than Bombardier or Francorail (which were roughly equivalent), it was MTA's judgement that the Bombardier schedule was more likely to be met. Bombardier's recent delivery record is quite impressive, while Budd is behind in current orders, with a backlog swelling to more than 1,100 cars. In fact, because Budd's Red Lion (Philadelphia) plant is filled to capacity, Budd proposed to build this order at a new assembly facility; first planned for Martinsville, Virginia and then for Hornell, New York. This was cause for considerable concern by MTA, in that either facility would require substantial capital investment and the hiring and training of a new work force. In light of MTA's concern for reliability and performance, and its recent experience with the faulty manufacture of both rail cars and buses, assembly by Budd at an unproven facility was a manufacturing risk MTA was most reluctant to take.

Bombardier's offer was also preferred on the basis of New York State economic activity that would be stimulated by its production plan. The Bombardier offer included 16% in New York content (with a potential of 20%), while Budd proposed 12% (including Hornell assembly) and Francorail 8%. The New York State Department of Commerce has confirmed MTA's judgement in this regard; it reported that the Bombardier award will produce the greatest number of jobs for New York State and will likely result in greater long-term benefits through repeat orders generated by the initial component manufacture.

Finally, MTA, as a matter of prudent business judgement, was unwilling to rely on the financial and manufacturing capacity of any single company for the two largest procurements in the five year rebuilding program. MTA has already committed to Budd for the purchase of 316 commuter cars at a price expected to exceed $350 million. Furthermore, Budd is competing for an additional subway car contract that will be awarded later this year. It is not in MTA's interest to rely so overwhelmingly on any single company, both from the short-term perspective of minimizing risks of delivery delays and the long-term perspective of generating competition within the car building industry for future MTA procurements.

In summary, while the economic analyses and negotiation process relating to this contract were extraordinarily complex, the ultimate decision as between the three bidders was clear. On the basis of all of the specified MTA objectives, Bombardier's offer was preferred.

APPENDIX M

LETTERS TO THE COMMISSION FROM THE UNITED STATES TRADE REPRESENTATIVE AND NOTICE OF INVESTIGATION IN THE FEDERAL REGISTER

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THE UNITED STATES TRADE REPRESENTATIVE
WASHINGTON
20506

May 25, 1982

The Honorable Bill Alberger
Chairman
U.S. International Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

Dear Mr. Chairman:

The Administration and the Congress have become increasingly concerned over the potential for trade distortion resulting from foreign government subsidization of financing for exports of capital equipment, including exports to the United States, and the consequent adverse effect on U.S. industries. Credit terms are very important in the sale of capital equipment. In the Trade Oversight Hearings before the Trade Subcommittee of the House Ways and Means Committee last October 28, I emphasized that foreign government subsidization of export financing not only affects U.S. exports, but can also distort competitive conditions in our own market.

The United States has entered into several international agreements regarding official export credit practices. Some of these agreements provide for minimum interest rates for sales into the United States and other countries; some, however, do not cover interest rates, or are limited to sales outside of the United States. None of these agreements, however, sanction trade-distorting subsidization of export credit financing.

To assess the impact on U.S. industries of trade distortions in capital equipment imports into the United States caused by subsidized export credits more information is needed on the extent to which such goods are sold, or are offered for sale, in the United States, the level of subsidization, and the impact on competition in the United States. Such information will be invaluable in enabling the Administration to deal with the problems created by such trade practices.

At the direction of the President, pursuant to section 332(g) of the Tariff Act of 1930, the U.S. International Trade Commission is requested to conduct an investigation and report to me on the sale in the United States of capital equipment from foreign countries with the aid of subsidized export credits. Because of the diversity of products and industries which could be involved, the study should be limited to civil transport aircraft, commuter size and larger, heavy electrical equipment, and self-propelled

rail cars. Sales of these items frequently involve financing provided with the assistance of the seller, and in the case of foreign manufacturers selling in the United States, this financing usually involves export credits provided by foreign official lending agencies.

The Commission's report should contain a comparison of sales of imported and domestically produced civil transport aircraft, heavy electrical equipment, and self-propelled rail cars in the United States during the past five years, including the terms of sale, an identification of instances where the financial arrangements were at interest rates below those being paid on funds borrowed on either domestic or international capital markets, the amount of such differences, and an assessment of the effect which such differences had on the sales and on conditions of competition between imported and domestic products. Since we are interested in the effect on competition in the U.S. market of the availability of subsidized export credits, the investigation should examine offers for sale as well as sales actually consummated. It would be helpful for the report to focus, as well, on selected case studies.

Your staff may wish to consult with my staff regarding further details of the study and specific complaints we have received from U.S. producers in this area.

We would appreciate receiving your report not later than November 26, 1982.

Very truly yours,

WILLIAM E. BROCK

WEB:zlp

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DEPUTY UNITED STATES TRADE REPRESENTATIVE

EXECUTIVE OFFICE OF THE PRESIDENT

WASHINGTON, D.C. 20506

202-395-5114

RECEIVED 82 SEP 3 A11:53 OFFICE OF THE SECRETARY DOCKET / USITC

82 SEP 2 P4:11 COMMISSIONER ECKES USITC

September 2, 1982

The Honorable Alfred E. Eckes
Chairman
United States International
Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

Dear Mr. Chairman:

We appreciated the opportunity to review on August 10, with members of your staff, OMB, and representatives of the large transport aircraft manufacturing industry, the direction, as it applies to that industry, of the Section 332(g) study number 332-144, requested May 25 by Ambassador Brock at the direction of the President. In light of those discussions with representatives of the Aerospace Industries Association staff, Boeing, Lockheed, and McDonnell Douglas, I am writing this letter to clarify what we should like to see covered in the subject study, in order to address best our objectives in requesting the study.

As stated in the third paragraph of Ambassador Brock's May 25 letter, our objective is to assess the impact on U.S. industries of trade distortions--actual and potential--caused by subsidized export credits extended by foreign governments in support of their capital equipment exports to the United States. At the August 10 meeting it became evident to both the USITC and USTR staffs that the fundamental objective of the study could not be attained, as regards the large transport aircraft sector, by an historical survey, for the import penetration to date is sufficient to provide only a few case histories and not a meaningful analysis of potential future impact.

Therefore, it would be appreciated if the Commission would modify this segment of the requested report to reflect not past experience, but rather the potential for future lost sales by the U.S. large transport aircraft industry due to changing market conditions and to export credit subsidies. In addition, the Commission should provide an estimate of the likely impact on the U.S. economy of the loss by a U.S. firm of a "typical" sales contract to foreign manufacturers in terms of the resulting unemployment and shipments lost in the large transport aircraft industry and in its supplying industries.

Because of the delay experienced this month in getting out the research questionnaire, we are willing to grant a delay until January 7, 1983, (rather than November 26, 1982) for receipt of the Commission's report.

Sincerely,

David R. Macdonald

FOR FURTHER INFORMATION CONTACT: Carol McCue Verratti, Esq., Office of the General Counsel, telephone (202) 523-0499.

By order of the Commission.

Issued: June 25, 1982.

Kenneth R. Mason,

Secretary.

[FR Doc. 82-17683 Filed 6-29-82; 8:45 am]

BILLING CODE 7020-02-M

[332-143]

Economic Impact of Foreign Export Credit Subsidies on the U.S. Commuter Aircraft Industry

AGENCY: International Trade Commission.

ACTION: Following receipt on May 27, 1982, of a request from the Committee on Finance of the U.S. Senate, the Commission instituted investigation No. 332-143 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), for the purpose of gathering and presenting information on the impact of export credit subsidies by foreign governments on the competitive position of U.S. producers of commuter aircraft. The study will present information on (1) the current structure of the U.S. commuter aircraft industry and that of major foreign competitors; (2) the current U.S. market for these aircraft; (3) the factors of competition in the market; (4) foreign government export credit policies relating to these aircraft and their impact on the competitive position of the U.S. industry; and (5) the likely future trends in the U.S. market.

EFFECTIVE DATE: June 16, 1982.

FOR FURTHER INFORMATION CONTACT: Ms. Deborah Ladomirak or Mr. Aaron Chesser, Machinery and Equipment Division, U.S. International Trade Commission, Washington, D.C. 20436, telephone 202-523-0131 or 202-523-0353, respectively.

Public Hearing

A public hearing in connection with the investigation will be held in the Commission Hearing Room, 701 E Street NW., Washington, D.C. 20436, beginning at 10:00 a.m., e.d.t., on September 28, 1982, to be continued on September 29, 1982, if required. All persons shall have the right to appear by counsel or in person, to present information, and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade Commission, 701 E Street NW., Washington, D.C. 20436, not later than noon, September 21, 1982.

Written Submissions

In lieu of or in addition to appearance at the public hearing, interested persons are invited to submit written statements concerning the investigation. Commercial or financial information which a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of § 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested persons. To be ensured of consideration by the Commission, written statements should be submitted at the earliest practicable date, but no later than October 6, 1982. All submissions should be addressed to the Secretary at the Commission's Office in Washington, D.C.

By order of the Commission.

Issued: June 21, 1982.

Kenneth R. Mason,

Secretary.

[FR Doc. 82-17686 Filed 6-29-82; 8:45 am]

BILLING CODE 7020-02-M

[332-144]

Economic Impact of Foreign Export Credit Subsidies on Certain U.S. Industries

AGENCY: International Trade Commission.

ACTION: Following receipt on May 27, 1982, of a request from the United States Trade Representative, the Commission instituted investigation No. 332-144 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), for the purpose of gathering and presenting information on the impact of export credit subsidies by foreign governments on the competitive position of U.S. producers of civil transport aircraft, commuter size and larger; heavy electrical equipment; and self-propelled railcars. For each of the three domestic industries, the study will present information on the following: (1) current industry structure, including major foreign competitors, and the current U.S. market; (2) factors of competition in the U.S. market and foreign trade; (3) comparison of sales and terms of sale of imported and domestically produced products; and (4) assessment of the impact of actual and lost sales and foreign offers for sales resulting from foreign export credit subsidies on the competitive position of the U.S. industry.

EFFECTIVE DATE: June 16, 1982.

FOR FURTHER INFORMATION CONTACT: Mr. Ronald J. DeMarines or Mr. Aaron Chesser, Machinery and Equipment Division, U.S. International Trade Commission, Washington, D.C. 20436, telephone 202-523-0259 or 202-523-0353, respectively.

Public Hearing

A public hearing in connection with the investigation will be held in the Commission Hearing Room, 701 E Street NW., Washington, D.C. 20436, beginning at 10:00 a.m., e.d.t., on September 28, 1982, to be continued on September 29, 1982, if required. All persons shall have the right to appear by counsel or in person, to present information, and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade Commission, 701 E Street NW., Washington, D.C. 20436, not later than noon, September 21, 1982.

Written Submissions

In lieu of or in addition to appearance at the public hearing, interested persons are invited to submit written statements concerning the investigation. Commercial or financial information which a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of § 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested persons. To be ensured of consideration by the Commission, written statements should be submitted at the earliest practicable date, but no later than October 6, 1982. All submissions should be addressed to the Secretary at the Commission's Office in Washington, D.C.

By order of the Commission.

Issued: June 21, 1982.

Kenneth R. Mason,

Secretary.

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The United States has entered into several international agreements regarding official export credit practices. Some of these agreements provide for minimum interest rates for sales into the United States and other countries; some, however, do not cover interest rates, or are limited to sales outside of the United States. None of these agreements, however, sanction trade-distorting subsidization of export credit financing.

To assess the impact on U.S. industries of trade distortions in capital equipment imports into the United States caused by subsidized export credits more information is needed on the extent to which such goods are sold, or are offered for sale, in the United States, the level of subsidization, and the impact on competition in the United States. Such information will be invaluable in enabling the Administration to deal with the problems created by such trade practices.

At the direction of the President, pursuant to section 332(g) of the Tariff Act of 1930, the U.S. International Trade Commission is requested to conduct an investigation and report to me on the sale in the United States of capital equipment from foreign countries with the aid of subsidized export credits. Because of the diversity of products and industries which could be involved, the study should be limited to civil transport aircraft, commuter size and larger, heavy electrical equipment, and self-propelled

Very truly yours,

WILLIAM E. BROCK

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export credits extended by foreign governments in support of their capital equipment exports to the United States. At the August 10 meeting it became evident to both the USITC and USTR staffs that the fundamental objective of the study could not be attained, as regards the large transport aircraft sector, by an historical survey, for the import penetration to date is sufficient to provide only a few case histories and not a meaningful analysis of potential future impact.

Therefore, it would be appreciated if the Commission would modify this segment of the requested report to reflect not past experience, but rather the potential for future lost sales by the U.S. large transport aircraft industry due to changing market conditions and to export credit subsidies. In addition, the Commission should provide an estimate of the likely impact on the U.S. economy of the loss by a U.S. firm of a "typical" sales contract to foreign manufacturers in terms of the resulting unemployment and shipments lost in the large transport aircraft industry and in its supplying industries.

the U.S. industry; and (3) the likely future trends in the U.S. market.

EFFECTIVE DATE: June 16, 1982.

FOR FURTHER INFORMATION CONTACT: Ms. Deborah Ladomirak or Mr. Aaron Chesser, Machinery and Equipment Division, U.S. International Trade Commission, Washington, D.C. 20436, telephone 202–523–0131 or 202–523–0353, respectively.

Public Hearing

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By order of the Commission.

Issued: June 21, 1982.

Kenneth R. Mason,

Secretary.

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